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Economic Effects

of

Implementing a Conservation Strategy

for the

Northern Spotted Owl

May 1, 1990

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TABLE OF CONTENTS

	Page
Executive Summary	01
Introduction	13
Economic Analysis	17
Timber Harvest Volume	19
Market Impacts of Alternative Federal Timber Flows	22
U.S. Roundwood Consumption Increasing	23
U.S. Product Demand	23
Costs and Technology	23
International Markets and Log Exports	23
Growth in Softwood Harvest is in the South	26
Total Pacific Coast Harvest Projected to Level Off After Decline in 2000	26
Industries Differ Between Washington/Oregon and California	26
Pacific Coast Must Compete With South and Canada	26
Fiber Products Industries Expanding	28
Log Exports Have Been a Growth Sector	28
Stumpage Prices Expected to Increase	28
Special Issues not Included in Analysis	28
Harvest by Ownership for Washington and Oregon	30
Effects of Changes in Assumptions	31
Scenarios and Combinations	34
General Economic Framework and Expected Economic Impacts	34
Economic Impacts	35
Regional and Local Effects	43
Background	43
Economic Areas	44
Employment Effects	45
Timber-based Revenues	49
Payments to Counties	49
General Effects on Counties and Communities	55
Social and Other Impacts	57
Summary of Economic Impacts and Implications for Mitigation Measures	58
Appendix	61
Maps of Dependent Communities and High Economic Impact Areas	

EXECUTIVE SUMMARY

In response to the findings of the Interagency Scientific Committee that was appointed to study the northern spotted owl, the Secretaries of Agriculture and Interior, through the Chief of the Forest Service and the Director of the Bureau of Land Management, formed an interagency working group. The charge to this group was to analyze the economic impacts of implementing the recommendations of the Interagency Scientific Committee.

ECONOMIC IMPACT

The analysis of economic impacts in Washington, Oregon, and California compares implementation of current plans for National Forests and Bureau of Land Management Districts with implementation of the spotted owl conservation strategy. "Current plans" for the Forest Service are final Forest Plans or draft Forest Plans where plans have not been finalized. For the Bureau of Land Management, the currently planned sale level by District are used.

The analysis considers the dynamics of the timber market economy. The effects of a timber supply reduction on Federal lands in Washington, Oregon, and California were analyzed nationally in terms of changes in price, consumption, trade, and interregional shifts in supply. The resulting effects on regional prices were examined to estimate potential response of private supply.

Changes in prices will also affect revenues to the Federal Treasury and payments to the three affected States. The analysis shows that rising prices will substantially offset reductions in timber volume. However, since the national economic situation in the future is uncertain, an analysis of the effect on revenues to the Treasury and payments to States if prices remain constant was also done and shown here for comparison.

In summary, the analysis shows:

- Timber harvest on Federal lands will decline by 2.4 billion board feet by 1995 and remain at that level under the Interagency Scientific Committee recommendations. (Table I).
- Private harvest increases in response to higher stumpage prices will reduce the effects of the Federal decline by about half in the near term (1995), but this increase cannot be sustained, and by 2000, timber harvest from Federal and private ownerships combined will be 2.7 billion board feet below the current level. (Table II)
- Current planned Federal harvest levels would support about 53,000 jobs in total; about half of these are direct employment in the forest industry. The loss of jobs by 1995 in response to the Federal harvest volume reduction would be about 25,500 jobs. (Table III)
- The private harvest response would mitigate the employment effect in 1995 and net job loss would be about 13,300. Private owners will not be able to sustain this higher level of production. By the year 2000, therefore, job loss as compared with the present will be about 28,000.
- Rising prices will help offset loss in revenues to the Treasury, but by 1995, implementation of the conservation strategy will mean a decline of $148 million and by 2000, a decline of $229 million as compared with revenues from currently planned levels of harvest. (Table IV)

- Since the future of the economy is uncertain, revenue loss was also estimated using constant prices over the decade of the 1990's. Under this scenario, returns to the Treasury would be $501 million lower in 1995 and 2000. (Table V)
- Payments to States will decline despite rising prices, particularly in Oregon as a result of large declines in revenues from BLM lands. In total, the decline would be about $65 million per year by 1995 and $86 million per year by 2000 under the rising price scenario. (Table VI)
- As with revenues, the decline in payments to States will be greater if constant prices are assumed. Under this scenario, about $172 million in revenue will be lost by these States. (Table VII)

Table I--Volume of Timber Offered for Sale on Federal Lands After Implementation of the Interagency Scientific Committee Conservation Strategy

Forests and Districts Affected by ISC Strategy	Current Plans	Actual or Projected Final Plans 1/		Actual or Projected Final Plans plus ISC Strategy	
		1995	2000	1995	2000
		(Million Board Feet)			
Washington					
Forest Service	943	752	752	419	419
Subtotal	943	752	752	419	419
Oregon					
Forest Service	2,209	1,848	1,848	1,362	1,362
Bureau of Land Mgmt.	1,176	1,176	1,176	443	443
Subtotal	3,385	3,024	3,024	1,805	1,805
California					
Forest Service	690	600	600	392	392
Bureau of Land Mgmt.	9	9	9	3	3
Subtotal	699	609	609	395	395
Total	5,027	4,385	4,385	2,619	2,619

1/ The timber volume used for projected final plans could change up to plus or minus 10 percent in actual final plans. A mid-point of this range is shown in order to assess the impact of implementing the ISC strategy.

NOTE: Final BLM new plan sale levels will not be known until the new plans are completed in 1992. Existing plan levels are carried into years 1995 and 2000 for comparative purposes only.

Table II--Changes in Timber Harvest on Public and Private Lands After Implementation of the Interagency Scientific Committee Conservation Strategy.

	Current Plans	Implementation of the ISC Strategy	
		1995	2000
	(Million Board Feet)		
Federal Lands Affected by the ISC Strategy			
Washington	943	-524	-524
Oregon	3385	-1580	-1580
California	699	-304	-304
Subtotal	5018	-2408	-2408
Private Lands			
Western Washington and Oregon	7235	585	-295
Eastern Oregon and Washington	630	375	35
California	2115	185	---
Subtotal	9980	1145	-260
Net Change		-1263	-2668

Table III--Changes in Timber-Based Employment That Would Result from Implementation of the Interagency Scientific Committee Conservation Strategy

	Change from Current Level with Implementation of ISC Strategy	
	1995	2000
	(Number of Jobs)	
Washington		
Forest Service	-5,853	-5,853
Bureau of Land Mgmt.		
Total	-5,853	-5,853
Oregon		
Forest Service	-8,569	-8,569
Bureau of Land Mgmt.	-7,669	-7,669
Total	-16,238	-16,238
Northern California		
Forest Service	-3,257	-3,257
Bureau of Land Mgmt.	-60	-60
Total	-3,317	-3,317
Total Public	-25,409	-25,409
Private lands		
Western WA & OR	+6,201	-3,127
Eastern WA & OR	+3,975	+371
California	+1,961	------
Total	+12,137	-2,756
Net Change	-13,272	-28,165

Table IV--Timber-Based Revenue After Implementation of the Interagency Scientific Committee Conservation Strategy--Rising Price Assumption

Forests and Districts Affected by ISC Strategy	Current Plans	Actual or Projected Final Plans 1/		Actual or Projected Final Plans plus ISC Strategy	
	1995	1995	2000	1995	2000
	(Millions of 1989 Dollars)				
Washington					
Forest Service	151	166	156	114	97
Subtotal	151	166	156	114	97
Oregon					
Forest Service	468	539	532	501	453
Bureau of Land Mgmt.	305	394	410	185	175
Subtotal	773	933	942	686	628
California					
Forest Service	99	107	103	75	68
Bureau of Land Mgmt.	1	2	2	1	1
Subtotal	100	109	105	76	69
Total	1024	1208	1203	876	795

1/ Numbers for projected final plans are based on projected timber volumes that could change up to plus or minus 10 percent in actual final plans. The numbers shown here are for the midpoint of this range in order to assess the impact of implementing the ISC strategy.

NOTE: Final BLM new plan sale levels will not be known until the new plans are completed in 1992. Existing plan levels are carried into years 1995 and 2000 for comparative purposes only.

Table V--Timber-Based Revenue After Implementation of the Interagency Scientific Committee Conservation Strategy--Constant Price Assumption

Forests and Districts Affected by ISC Strategy	Current Plans	Actual or Projected Final Plans 1/		Actual or Projected Final Plans plus ISC Strategy	
	1995	1995	2000	1995	2000
		(Millions of 1989 Dollars)			
Washington					
Forest Service	151	119	119	64	64
Subtotal	151	119	119	64	64
Oregon					
Forest Service	468	402	402	292	292
Bureau of Land Mgmt.	305	305	305	110	110
Subtotal	773	707	707	402	402
California					
Forest Service	99	88	88	56	56
Bureau of Land Mgmt.	1	1	1	2/	2/
Subtotal	100	89	89	56	56
Total	1024	915	915	523	523

1/ Numbers for projected final plans are based on projected timber volumes that could change up to plus or minus 10 percent in actual final plans. The numbers shown here are for the midpoint of this range in order to assess the impact of implementing the ISC strategy.

2/ Less than one million.

NOTE: Final BLM new plan sale levels will not be known until the new plans are completed in 1992. Existing plan levels are carried into years 1995 and 2000 for comparative purposes only.

Table VI--Payment to States After Implementation of the Interagency Scientific Committee Conservation Strategy--Rising Price Assumption

Forests and Districts Affected by ISC Strategy	Current Plans	Actual or Projected Final Plans 1/		Actual or Projected Final Plans plus ISC Strategy	
	1995	1995	2000	1995	2000
		(Thousands of 1989 Dollars)			
Washington					
Forest Service	36,496	39,565	37,446	27,115	23,213
Subtotal	36,496	39,565	37,446	27,115	23,213
Oregon					
Forest Service	99,340	114,528	112,807	105,696	94,863
Bureau of Land Mgmt.	161,705	205,100	213,048	95,703	91,118
Subtotal	261,045	319,628	325,855	201,399	185,981
California					
Forest Service	21,919	23,963	22,989	16,761	15,271
Bureau of Land Mgmt.	54	67	64	24	22
Subtotal	21,973	24,030	23,053	16,785	15,293
Total	319,514	383,223	386,354	245,299	224,487

1/ Numbers for projected final plans are based on projected timber volumes that could change up to plus or minus 10 percent in actual final plans. The numbers shown here are for the midpoint of this range in order to assess the impact of implementing the ISC strategy.

NOTE: Final BLM new plan sale levels will not be known until the new plans are completed in 1992. Existing plan levels are carried into years 1995 and 2000 for comparative purposes only.

Table VII--Payment to States After Implementation of the Interagency Scientific Committee Conservation Strategy--Constant Price Assumption

Forests and Districts Affected by ISC Strategy	Current Plans	Actual or Projected Final Plans[1/]		Actual or Projected Final Plans plus ISC Strategy	
	1995	1995	2000	1995	2000
	(Thousands of 1989 Dollars)				
Washington					
Forest Service	36,496	28,481	28,481	15,354	15,354
Subtotal	36,496	28,481	28,481	15,354	15,354
Oregon					
Forest Service	99,340	85,087	85,087	61,334	61,334
Bureau of Land Mgmt.	161,705	161,705	161,705	58,333	58,333
Subtotal	261,045	246,792	246,792	119,667	119,667
California					
Forest Service	21,919	19,483	19,483	12,415	12,415
Bureau of Land Mgmt.	54	54	54	18	18
Subtotal	21,973	19,537	19,537	12,433	12,433
Total	319,514	294,810	294,810	147,454	147,454

[1/] Numbers for projected final plans are based on projected timber volumes that could change up to plus or minus 10 percent in actual final plans. The numbers shown here are for the midpoint of this range in order to assess the impact of implementing the ISC strategy.

NOTE: Final BLM new plan sale levels will not be known until the new plans are completed in 1992. Existing plan levels are carried into years 1995 and 2000 for comparative purposes only.

Introduction

INTRODUCTION

The purpose of this report is to describe anticipated economic effects that would result from implementation of the conservation strategy for the Northern Spotted Owl recommended by the Interagency Scientific Committee.

Over the past several years, there has been tremendous interest in the northern spotted owl, its habitat, and its relationship to timber production in the Pacific Northwest. As part of the effort to gather thorough and timely information on the issue, an Interagency Scientific Committee was established to address the conservation of the northern spotted owl. This Committee was established through a 1988 agreement between the USDA Forest Service, the USDI Bureau of Land Management, the USDI National Park Service, and the USDI Fish and Wildlife Service. The Committee's charter was subsequently incorporated into Section 318 of Public Law 101-121 in October 1989.

After many months of gathering and analyzing information, the Committee released a report entitled "A Conservation Strategy for the Northern Spotted Owl" on April 3, 1990. The proposed strategy in that report has since been analyzed by the Bureau of Land Management and the Forest Service to determine the economic effects if the strategy were fully implemented. This report describes the estimated economic effects of implementing the owl conservation strategy.

To estimate and describe possible effects, it was necessary to make certain assumptions and envision certain scenarios. For example, timber price responses to a reduction in timber supply are uncertain, so effects with the expected price change and effects with no price change are both shown. This provides a range in which the reader can project and consider his or her own assumptions and predictions. Numbers in the report generally were not rounded off, but were left as developed from the analysis. This specificity should not be interpreted as an indication of high precision; instead the numbers should be used as an estimate of the direction and magnitude of changes.

The report was prepared by the Forest Service, USDA, and the Bureau of Land Management, USDI. The following team provided leadership in completing the report:

Interagency Economic Effects Team

Tom Hamilton, Forest Service, Team Leader
Joe Zimmer, Bureau of Land Management, Team Leader
Phil Stanbro, Bureau of Land Management
Mel Berg, Bureau of Land Management
Dave Darr, Forest Service
Bill Levere, Forest Service
Richard Haynes, Forest Service
Bill Lange, Forest Service
Al Fox, Forest Service
Mike Skinner, Forest Service
Don Eagleston, Forest Service
Bob Biesterfeldt, Forest Service

Economic Analysis

ERRATA

Page 20, Figure 1--The Forest Service harvest volume for 1982 is 2.4 billion board feet; the chart incorrectly shows 3.4 billion.

Page 42, Table 3--Years shown for columns were shifted; the correct dates are:

Column 1 - no date
Column 2 - 1995
Column 3 - 2000
Column 4 - 1995
Column 5 - 2000

Page 46, Table 4--Employment for the Eugene, Oregon BLM District for the Current and Final Plans columns should be 2,473 (the table incorrectly shows 4,473 for this District). The table totals are correct as shown.

ECONOMIC ANALYSIS

TIMBER HARVEST VOLUME

This section of the report focuses on the current timber situation in Washington, Oregon, and California, and expected economic impacts if the Conservation Strategy recommended by the Interagency Scientific Committee is implemented. The report concentrates on dollar and employment impacts in the affected areas of these three States. However, it also examines the effect nationally of a reduction in Federal timber harvest in Washington, Oregon, and California.

The data for adjusted timber harvest levels are the latest available from the Forest Service and Bureau of Land Management. The starting point for these analyses is the allowable sale quantity (ASQ) in existing plans. For the Forest Service, this is a combination of final Forest Plans, or draft Forest Plans for forests where plans have not been finalized. For the Bureau of Land Management, the starting point is the currently planned sale level by district. These starting point levels are lower than recent harvest levels. For example, for Forest Service Region 6 (Washington and Oregon), the starting point level is about 4 billion board feet; in recent years, harvest has exceeded 5 billion in these two States. The starting point was selected for two reasons. First, it represents currently planned outputs from these Federal lands and associated employment effects were a part of the planning process. Second, it approximates historic levels of harvest. Figure 1 shows the harvest for Forest Service and Bureau of Land Management lands for the period, 1980-1988. During this period, there was a substantial amount of fluctuation in timber harvest from 2.3 to 5.5 billion board feet per year on National Forests and from 0.3 to 1.4 billion on BLM lands. However, the average harvest was 4.1 billion and 0.9 billion, respectively--about the same as the starting point level in the analysis.

The analysis shown here is based on the change from this starting point volume if the Conservation Strategy recommended by the Interagency Scientific Committee were fully implemented. For the Forest Service, an interim step is also shown. This interim step shows a timber volume for projected final plans for those forests where plans are still in draft stage. These projected volumes could change up to plus or minus 10 percent in actual final plans. The mid-point of this range is used in this report in order to assess the impact of implementing the ISC strategy.

The Bureau of Land Management is now preparing new resource management plans for its Western Oregon districts. Because these plans are not scheduled to be completed until 1991, no resulting timber harvest levels can be predicted. Base-line levels for the BLM are, therefore, considered to be continuation of the existing plans developed in the late 1970's and early 1980's for the purpose of this study.

Table 1 shows the changes in ASQ volume for forests and districts affected by the Spotted Owl Conservation Strategy. In total, the reduction on Forest Service and Bureau of Land Management lands would be 2.4 billion board feet, a decrease of 48 percent from the currently planned level. The ASQ reduction on Federal lands affected by the ISC Conservation Strategy would be 55 percent in Washington, 46 percent in Oregon, and 43 percent in California.

About 1 billion board feet of timber are harvested on State lands in these three States each year. No analyses of timber volume reduction for these lands were made in this study.

Figure 1 Volume of timber harvested from USDA Forest Service PNW REGION and Bureau of Land Management in WA&OR

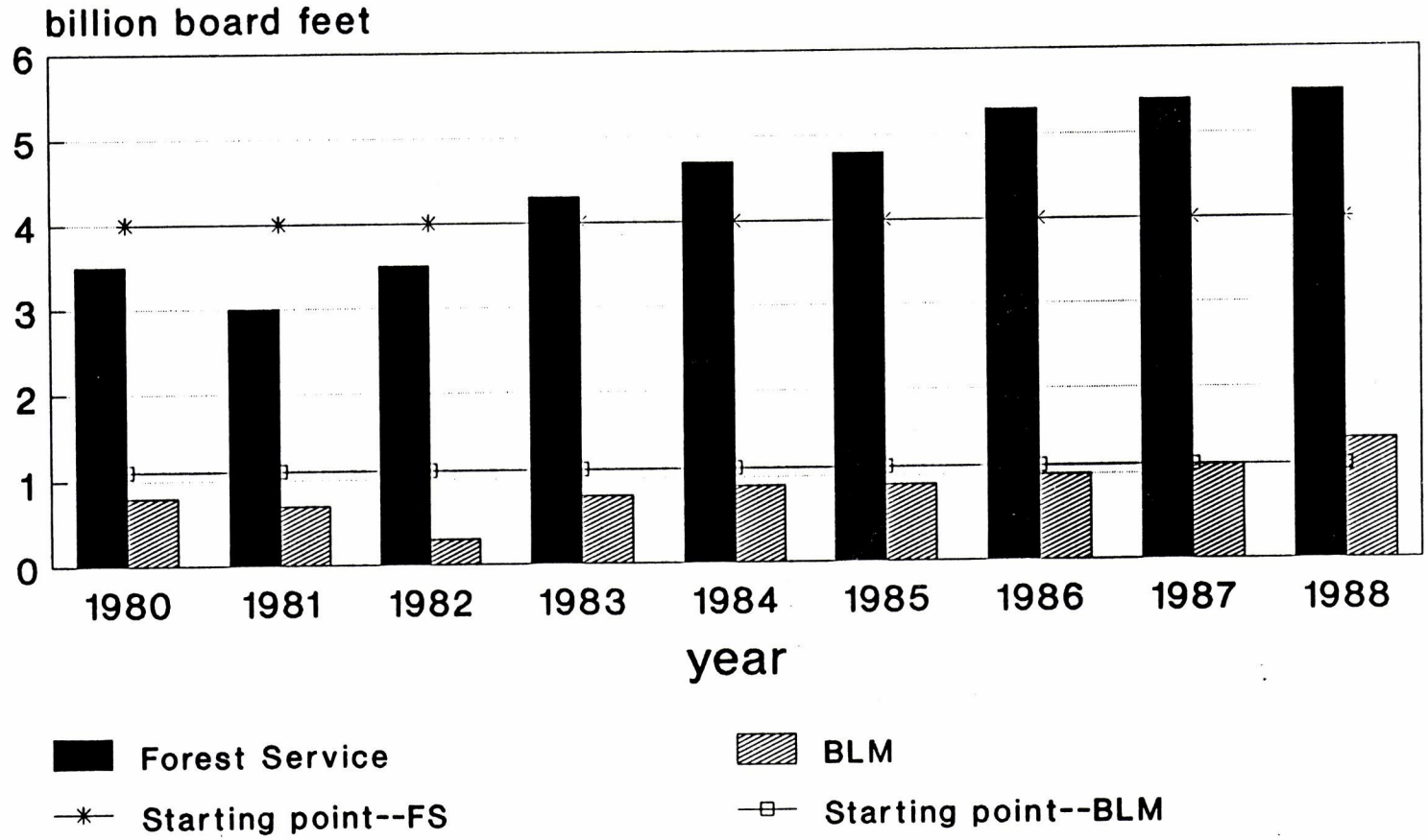


Table 1--Volume of Timber Offered for Sale on Federal Lands After Implementation of the Interagency Scientific Committee Conservation Stretegy.

Forests and Districts Affected by ISC Strategy	Current Plans	Actual or Projected Final Plans		Actual or Projected Final Plans plus ISC Strategy	
		1995	2000	1995	2000
		(Million Board Feet)			
Washington National Forests					
Gifford Pinchot 1/	388	334	334	189	189
Mt. Baker-Snoqualmie 1/	170	108	108	45	45
Okanogan 1/	63	63	63	59	59
Olympic 1/	186	111	111	43	43
Wenatchee	136	136	136	83	83
Subtotal	943	752	752	419	419
Oregon National Forests					
Deschutes 1/	202	100	100	91	91
Mt. Hood 1/	255	193	193	154	154
Rogue River 1/	137	120	120	85	85
Siskiyou	160	160	160	119	119
Suislaw 1/	335	335	335	198	198
Umpqua 1/	340	334	334	273	273
Willamette 1/	568	491	491	333	333
Winema 1/	199	115	115	110	110
Oregon BLM Districts					
Salem	239	239	239	62	62
Eugene	223	223	223	59	59
Roseburg	247	247	247	103	103
Medford	213	213	213	123	123
Coos Bay	254	254	254	96	96
Subtotal	3,385	3,024	3,024	1,805	1,805
California National Forests					
Klamath 1/	200	142	142	110	110
Mendocino 1/	93	84	84	58	58
Shasta-Trinity 1/	226	224	224	132	132
Six Rivers 1/	175	150	150	92	92
California BLM District					
Ukiah	9	9	9	3	3
Subtotal	699	609	609	395	395
Total Public	5,027	4,385	4,385	2,619	2,619

1/ The timber volume shown for projected final plans in these forests could change up to plus or minus 10 percent in actual final plans. A mid-point of this range is shown in order to assess the impact of implementing the ISC strategy.

NOTE: Final BLM new plan sale levels will not be known until the new plans are completed in 1992. Existing plan levels are carried into years 1995 and 2000 for comparative purposes only.

In cooperation with the Fish and Wildlife Service, interested tribes in the northern spotted owl study area are being briefed on the results of the study. At this time, the effects of the study's recommendations on the Bureau of Indian Affairs' timber sales program and its ability to comply have not been fully evaluated. It is possible, however, that additional fiscal resources, both human and financial, may be needed to comply with the study recommendations, should they be adopted by the Bureau of Indian Affairs. Likewise, the effects on the annual allowable harvest level and tribal revenues will be evaluated. In the event it is determined that impacts on tribes and on Indian forestry programs will occur, the information will be provided.

The remaining large ownership, private lands, is examined as part of the analysis that follows. Timber production on these lands has historically responded directly to economic conditions and could help mitigate short-term effects of reduced public timber availability. The analysis will examine this potential response and the associated effects on employment.

MARKET IMPACTS OF ALTERNATIVE FEDERAL TIMBER FLOWS

Federal timber in Washington, Oregon, and California comes from timberlands managed by the USDA Forest Service and the USDI Bureau of Land Management (BLM). Although the legislative mandates for stewardship differ between the two agencies, implementation of the ISC report will cause changes on all Federal timberlands. This section highlights the various economic effects of alternative federal timber flows. Regional and national effects on product and timber markets are reported.

Impacts of alternative flows of federal timber are estimated as changes from a base-line projection of future timber markets, given the assumptions in the 1989 RPA Timber Assessment. The model used for the projections is the Timber Assessment Market Model--TAMM (Adams and Haynes 1980 and Haynes and Adams 1985). It provides an integrated structure for considering the behavior of prices, consumption, and production in both stumpage and product markets.

Projections from TAMM reflect the consequences of balancing the supply of timber and the demand for the final products made from that timber. The projections recognize that production and consumption are sensitive to both product prices and production costs. They also recognize that different types of landowners have different propensities for harvesting and managing their timberlands. Private harvests are treated as price and inventory responsive while public harvests are treated as fixed at predetermined levels. TAMM also includes an inventory projection system for private timberlands.

In the past decade, TAMM has been used widely within the USDA Forest Service and by interest groups to estimate the market impacts of various policies and issues. The present version serves best as an indicator of long-term trends. For example, in the 1989 RPA Timber Assessment, it was used to make projections to the year 2040. TAMM is used in this analysis to examine market impacts for the 1990's. In comparing alternative ASQ levels for Federal timber, emphasis is on differences from the base-line projection rather than the projections themselves.

Our analysis begins with a summary of historical trends and the findings in the base-line projection. Then, assumptions are changed and market impacts are estimated as differences from the base-line projection.

U.S. Roundwood Consumption Increasing

Total U.S. consumption (figure 2) of softwood roundwood from growing stock was 14.3 billion cubic feet in 1986. This was roughly 75 percent above the average consumption in the early 1950's. It is expected to remain about at this level through 2000 and then to increase to 17.5 billion cubic feet by 2040, with the largest increase in pulpwood. In the near term, rising prices help slow the growth in consumption, but in the longer term a slowing of domestic markets (especially for residential construction) and increasing use of hardwoods accounts for slower projected growth in demand for softwood timber. The United States will remain a net importer of softwood forest products. This is especially the case for softwood lumber imports from Canada.

Figure 3 shows long-term trends in softwood harvest by major U.S. region. After World War II, strong demand for forest products and declining private harvests brought expanded markets for public timber. On Federal timberlands, management policies shifted from the custodial posture of the inter-war years toward an active program of timber sales. National Forest harvest more than doubled in the 15 years after 1950. By the late 1960's, the harvest was approaching the maximum levels under existing management plans, and the Forest Service adopted a nondeclining even-flow approach to the computation of allowable cuts. Harvest has gradually declined over the past 20 years. Harvest on BLM timberlands (primarily in Oregon) have been roughly constant for the past 15 years.

U.S. Product Demand

Only limited growth in demand for solid-wood products will take place in the future. As the population ages, growth in real GNP slows and new housing construction is stable to declining. Consumption increments come almost entirely from increased wood use in residential upkeep and alteration, nonresidential construction, and manufacturing. U.S. lumber consumption rises to 56 billion board feet by 2040 (the 1987 peak was 50.6 billion feet). Plywood consumption returns to 23 billion square feet by 2040 (the current level is 21 billion feet) after a period of modest substitution-induced decline over the next 20 years. In the fiber products sector, growth in consumption slows in line with GNP and also because of assumed increases in the use of recycled fibers. For western Washington and western Oregon, pulp output is projected to grow by roughly 20 percent over the 50-year projection period.

Costs and Technology

Real non-wood costs (output basis) for solid-wood mills fall by less than 0.5 percent per year as labor productivity continues to improve and use of other materials and energy falls. Recovery (product output per cubic foot of log input) rises at roughly 0.1 percent year over the 50-year projection. This is a far slower rate than observed in the 1980's due to rapidly declining future log size and quality.

International Markets and Log Exports

After 1984, the value of the U.S. dollar dropped sharply against the Japanese yen. This plus a good housing market in Japan stimulated Japanese imports of softwood logs and lumber from the Pacific Northwest. In addition, China entered the market for U.S. logs in the early 1980's with the Pacific Northwest being the source of much of the supply. Thus, Washington and Oregon had additional sources of demands for logs not shared by other U.S. regions. As a result, softwood lumber and plywood manufacturers in the Pacific

Figure 2 U.S. softwood roundwood consumption by product, 1952-2040

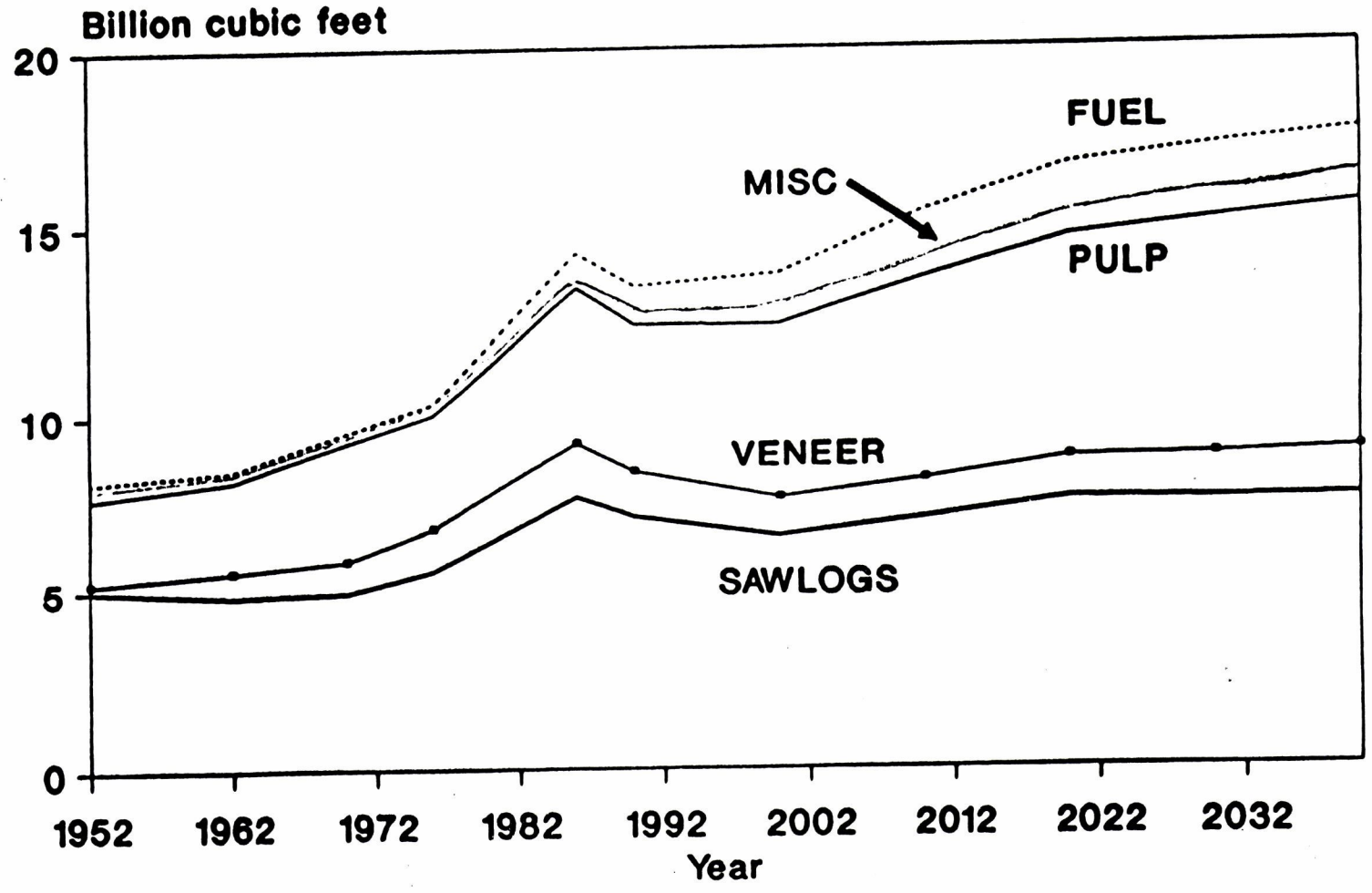
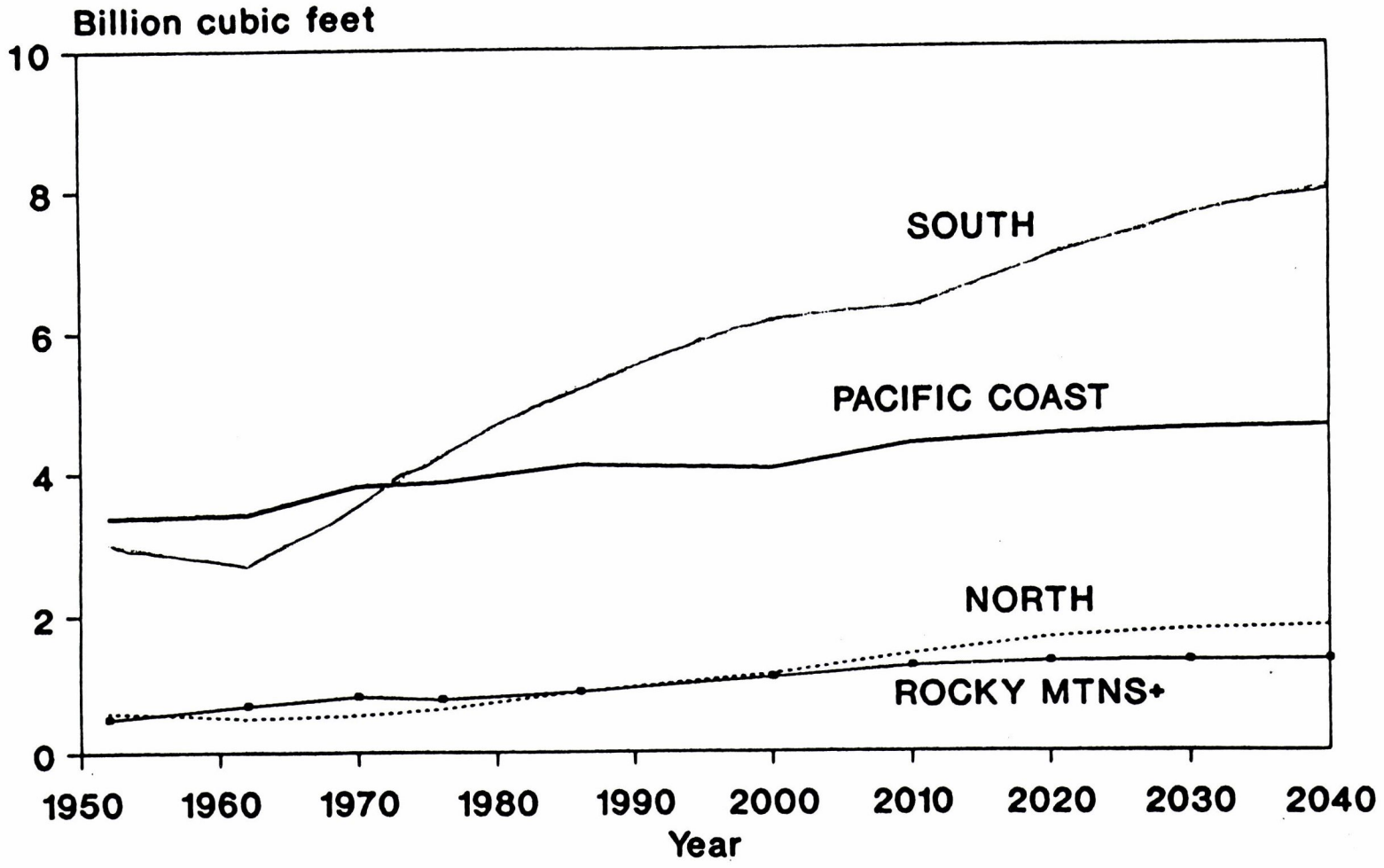


Figure 3 U.S. softwood timber harvest
by region, 1952-2040



Northwest have to compete against log exporters for raw material supplies to a much larger extent than manufacturers in other regions of the country.

Canadian softwood lumber producers will experience gradually rising delivered wood costs as haul distances increase and stand densities fall. The real Canadian-U.S. exchange rate is expected to change little from the current level. In the base case, exports of lumber and plywood grow little over the projection period. Log exports fall from the 1984-1988 average level of 3.1 billion board feet per year (1988 peak level of 3.6 billion feet) to an average of 2.5 billion board feet by 2000. Limitations in product and declining log export volumes derive from the assumption of increased competition from Canada,the Southern Hemisphere, and the Soviet Union.

Growth in Softwood Harvest is in the South

In figure 3, there are two trends to note. First, the three West Coast States together and the South are expected to remain the two most important timber producing regions in the United States. Second, the South overtook the Pacific Coast in the mid 1970s. Equally important is the share of Federal harvest which in 1986 constituted 21 percent of total harvests. By 2000, this fraction is expected to drop to 19.4 percent. Thereafter, this fraction continues to decline, reaching 16.4 percent by 2040.

Total Pacific Coast Harvest Projected to Level Off After Decline in 2000

For the Pacific Coast, harvests over the last three years have been at all time highs. Figure 4 shows softwood harvest by owner. The smallest ownership class (in terms of harvest) is the nonindustrial private timberland. Harvest on this ownership had been declining from the early 1950s until 1986. After that, harvest in western Washington and western Oregon started to increase. The share of federal timber has changed over the past several decades from 18 percent in 1952 to 39 percent in 1986. The share is expected to slowly decline in the future to 34 percent by 2040.

Industries Differ Between Washington/Oregon and California

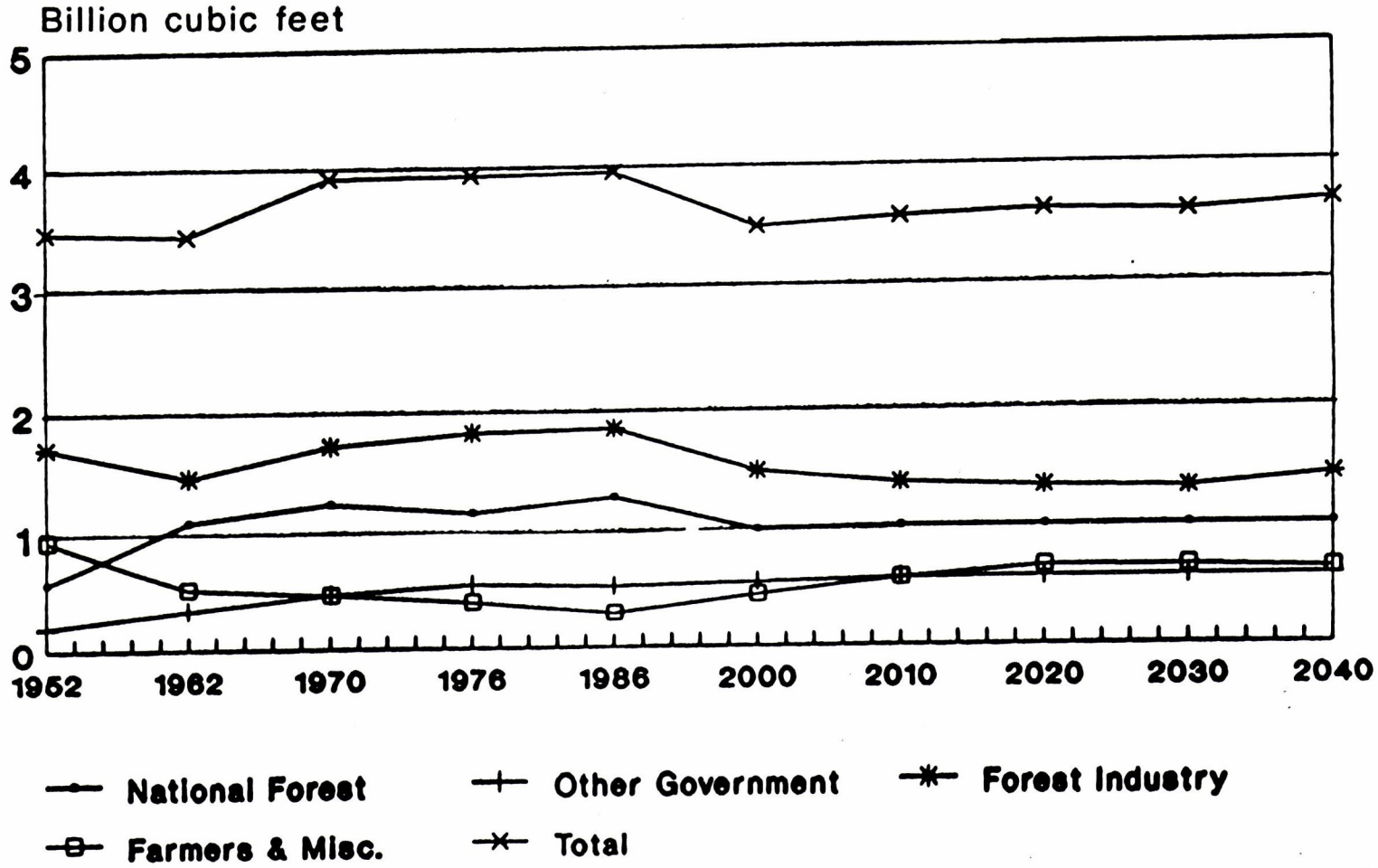
The industry differs between the two areas primarily in the absolute size of the lumber industry and in the concentration of the softwood plywood industry in western Washington and western Oregon. The Douglas-fir subregion also contains roughly 8 million tons of pulp and paper production. There is only a small pulp and paper industry in California that focuses on conversion. Solid-wood products are expected to continue their dominance of the forest products industry in the Pacific Coast region. The exception is the plywood industry where production in the Douglas-fir subregion is expected to drop as a consequence of competition from oriented strand boards and in California where production has declined because of competitive pressures from other plywood producing areas.

Pacific Coast Must Compete With South and Canada

Output of the solid-wood products industries (lumber and plywood) in the Pacific Coast regions has fluctuated with periodic construction cycles but has shown essentially no upward or downward trend since the mid-1960's (except for the clear drop in plywood production in California). Growth in U.S. consumption over the past two decades has been met by the South in the case of plywood and by the South and Canada in the case of softwood lumber.

The Pacific Coast's share of aggregate national and virtually all regional markets has fallen steadily. These trends are a reflection of the region's high production costs relative to its key North American competitors. As a result of increases in both delivered wood and nonwood costs, the region emerged as the high cost lumber and plywood producer in

Figure 4 Total removals of softwood timber from WA, OR, and CA, by ownership, 1952-2040



North America in the early 1970's. The recession of 1980-82 brought a sharp drop in delivered wood costs due both to declining stumpage prices and reduction in log and haul costs. This change helped to narrow the cost differential with the South but did little to overcome the strong wood cost advantage of interior British Columbia in the case of lumber. Reductions in work force and improvements in recovery efficiency also have acted to lower nonwood costs, but the region remains the high cost producer in both lumber and plywood.

Fiber Products Industries Expanding

The fiber products industry in western Washington and western Oregon has expanded steadily as paper and board facilities have been integrated with pulping operations. Recent increases have come in newsprint and unbleached kraft (linerboard and packaging) grades, with stable to declining output in fine and other papers. Production is from otherwise unused residues from solidwood production, from wastepaper, and from roundwood, chipped in the woods or at other remote locations.

Log Exports Have Been a Growth Sector

Log exports have comprised the most significant growth sector especially in western Washington and western Oregon, consuming some 20 percent of total regional harvest by 1980. After peaking in the late 1970's, log exports from this region fell in the 1980-82 recession. They subsequently recovered to all time highs in 1988 and 1989. Despite the sharp drop in volumes in the early 1980's, export prices did not fall as rapidly as domestic prices and exports remained a key revenue source for some regional firms during the recession. In the recovery, the People's Republic of China (PRC) has emerged as the second largest importer. Logs exported to the PRC are roughly the same quality as those used in domestic mills.

Stumpage Prices Expected to Increase

As a consequence of this increasing pressure on domestic timber inventories, timber prices are expected to continue to increase in real terms. Stumpage prices during the next decade are expected to increase by 1.2 percent per year in the Douglas-fir subregion and 2.5 percent per year in the South. Also embodied in these projections are improvements in technology that will decrease employment by 13 percent over the next 15 years.

There are differences in harvest and industry trends between California and Washington/Oregon. Total timber harvest (sawtimber and nonsawtimber) in Washington/Oregon reached all time high levels during the last three years while those in California have been stable but below those seen in the early 1950s.

Special Issues not Included in Analysis

There are many current issues whose resolution could lead to changes in the base-line projection. The following issues were considered, but not included in the base-line analysis because their resolution is uncertain or their potential effects on timber supplies are uncertain:

- o Roadless areas
- o Below cost timber sale programs
- o New perspectives
- o Effect of recycling on Canadian timber supplies

o Productivity of nonindustrial private forest lands
o Paper and board recycling

Roadless Areas

It has been suggested that timber harvesting be banned on existing roadless areas in National Forests. Implementation of the ISC report will have this effect in the Pacific Northwest. The ASQ for the Alaska Region would be reduced from 75 million cubic feet to 13 million. In Pacific Southwest, the reduction would be about 15 million cubic feet, for the Rocky Mountain Regions, 10 million cubic feet, for the Southern Region, 10 million cubic feet, and for the Northern Region, no effect. For the contiguous States, the ASQ would decline 123 million cubic feet or about 7 percent of the National Forest ASQ after taking account of the recommendations of the ISC report.

Below Cost Timber Sale Programs

It has been suggested that all below cost timber sale programs be eliminated. The main effects of this action would be in the Rocky Mountain regions where the ASQ would decline 135 million cubic feet or 32 percent of the total National Forest ASQ for these regions. The ASQ for Pacific Southwest would decline 15 million cubic feet, for the Southern Region, 25 million cubic feet and for the Northern Region, 10 million cubic feet. For the contiguous States, the total decline is 185 million cubic feet--10 percent of the ASQ for all National Forests.

There is the possibility that implementation of the ISC report recommendations would raise stumpage prices enough to substantially eliminate below cost timber sale programs. The prices for many of the below cost timber programs are within $10 per thousand board feet of the cost.

New Perspectives

The silvicultural practices associated with the new perspectives in forestry concept will have as an effect an increase in logging costs. The extent of application of new perspectives on National Forests is yet to be determined. The increase in logging costs may be enough to result in emergence of additional below cost programs. These higher costs would be offset somewhat by higher stumpage prices associated with implementation of the ISC report recommendations, however.

Effect of Recycling on Canadian Timber Supplies

The potential effects of recycling on the North American timber industries are many and complex. Among the most complex and important is the potential effect of recycling on the Canadian timber resource. The United States relies on Canada for some 9 million tons of newsprint per year--More than one-half of consumption. If recycling in the United States results in mandated percentages of recycling in newsprint, the Canadian industry would find it difficult to acquire enough wastepaper to meet the requirement. This would provide new opportunities for the U.S. newsprint industry. It would also provide additional roundwood volumes for the solid wood segment of the Canadian industry. This may affect the outlook for imports of softwood lumber from Canada.

One response to implementation of the ISC report is to increase imports of softwood lumber from Canada. In the absence of a nationwide overview of timber demand and supply relationships in Canada, there has developed different opinions about long-term

timber supply prospects in Canada. One view has it that Canada is near the ceiling on timber supply and that significant, sustained increases in production would be difficult. A second view is that there are significant volumes of softwood timber that are currently economically inaccessible. Sustained increases in roundwood prices such as from implementation of the ISC report would make these roundwood volumes economically accessible. In addition, Canada sells some 3 billion board feet of softwood lumber to offshore markets. Significant increases in prices in the United States would tend to draw lumber away from offshore markets. For the purposes of analysis of impacts of implementation of the ISC report, it was assumed that Canada will continue to be as responsive in the future as it has been in the past to increases in roundwood and softwood lumber prices in the United States.

Productivity of Nonindustrial Private Forest Lands

Private forest land can offset some, but not all, of the reduction in ASQ on National Forests. In the base-line projection, forest industry land is assumed to be managed intensively and some intensification of management is assumed to be the case for nonindustrial private forest lands as reflected by remeasurement of forest inventory plots. These assumptions lead to the establishment of 50 million acres of southern pine plantations by 2040 as compared with 20 million today. These additional plantations have major effects on the long-term supply/demand outlook, but not in the short term.

State and local control of harvesting and management activities on privately owned forest land may be becoming more common. The effects of these controls are under study, but no explicit consideration of them is given in the base line projection. Although they may lead to short-term decreases in supplies, in the long term, they may lead to long-term supply increases in response to increased management of private lands. The three proposed initiatives now under consideration in California to limit various silvicultural and final harvest practices (a form of State control) also were not considered in the various projections. If any or all three of the initiatives pass, then harvest response from private timberlands in California will be less than shown in the projections.

Paper and Board Recycling

The American Paper Institute (API) recently announced that the paper industry would increase the recovery of paper and board products from a current rate of 33 percent today to a recovery rate of 40 percent by 1995. The API recycling goal has the effect of "freeing up" timber in the South and other regions that would have have otherwise been used in pulp and paper production. The API recycling goal was analyzed. Effects on the Pacific Northwest and Southwest are significant only after the year 2000. Revenue from timber sales in these regions would decline relative to the base scenario no more than two percent in the year 2000 as a result of the API recycling goal.

Harvest by Ownership for Washington and Oregon

The U.S. timber industries in the 1980's were affected by the strong business cycle that characterized the decade. The early years were characterized by slowing economic growth and high interest rates that caused a severe recession in the home building industry. However, beginning in 1983 and continuing through 1989, there was an unprecedented period of high wood consumption in the United States. These sustained high levels of consumption increased domestic harvest and imports of lumber from Canada.

The recession also caused structural shifts in timber sale programs for the Forest Service, the Bureau of Land Management, and the State of Washington Department of Natural

Resources. The late 1970's was a time of high inflation that was reflected in part in high bids for timber harvesting rights for these three agencies. In western Washington and western Oregon, there was no escalation clause in Federal contracts permitting changes in the bid price according to market conditions. Contracts stipulated that the purchaser pay the bid price. Contracts for State of Washington timber sales were similar to those used by Federal Agencies. When the recession came, markets did not support the high prices bid for timber in previous years. When the 3 to 5 year contracts started to become due, purchasers appealed for relief. Under the terms of relief legislation, purchasers could avoid having to fulfill original contracts if they met specified circumstances. In addition, timber sale contracts were changed in 1983-84 to try to avoid a repeat of the conditions that led to the buy-back of timber sale contracts.

The harvest of timber on private timberland has also been affected by structural change. By the end of the 1980's, much of the old-growth timber on forest industry land was harvested and an increasing proportion of the harvest is composed of second-growth timber from northwest Oregon and the Puget Sound region. This transition to second-growth timber was one of the driving forces behind the change to modern technology in mill processing.

Thus, timber harvest by owner in the Pacific Northwest in the 1980's was determined in part by the market and in part by the political process within an environment that was unique in the United States. The effects of these forces are reflected in the harvest patterns for these ownerships shown in table 2. In general, markets have been good for timber products and it is within this context that alternative scenarios are presented for the future.

Finally, Forest Service sales programs in the last 15 years have averaged 1.8 and 4.9 billion board feet in the Pacific Southwest and Northwest Regions. These sales programs have been relatively constant (figure 5) and uninfluenced by economic cycles during the period. Harvest levels, though, are much more variable. For example, harvest in the Pacific Northwest has ranged from from 2.5 to 5.5 billion board feet. Harvest levels have averaged 1.7 and 4.4 billion board feet in the Pacific Southwest and Northwest Regions, respectively, during this period. Different harvest than sales levels results from a number of factors including the build up of uncut volume during 1980-1983, reporting inconsistencies between cut and sold, and timber appraisal practices.

Effects of Changes in Assumptions

The basic approach used in this economic analysis is one referenced to as scenario planning (Wack 1985). There are four scenarios in the analysis. All employ the same assumptions as for the base-line projection regarding trends in demand determinants for solidwood and fiber products, nonwood production costs, technology, nonindustrial harvest response, and trade with countries other than Canada. The four scenarios are compared with a base-line projection that assumes total Forest Service ASQ of 4.9 billion board feet for the Pacific Northwest Region and the northern California Forests of the Pacific Southwest Region. For the Bureau of Land Management, an ASQ of 1.2 billion board feet is assumed.

The 4 scenarios are termed plans, owls, logx1 and logx2.

Plans

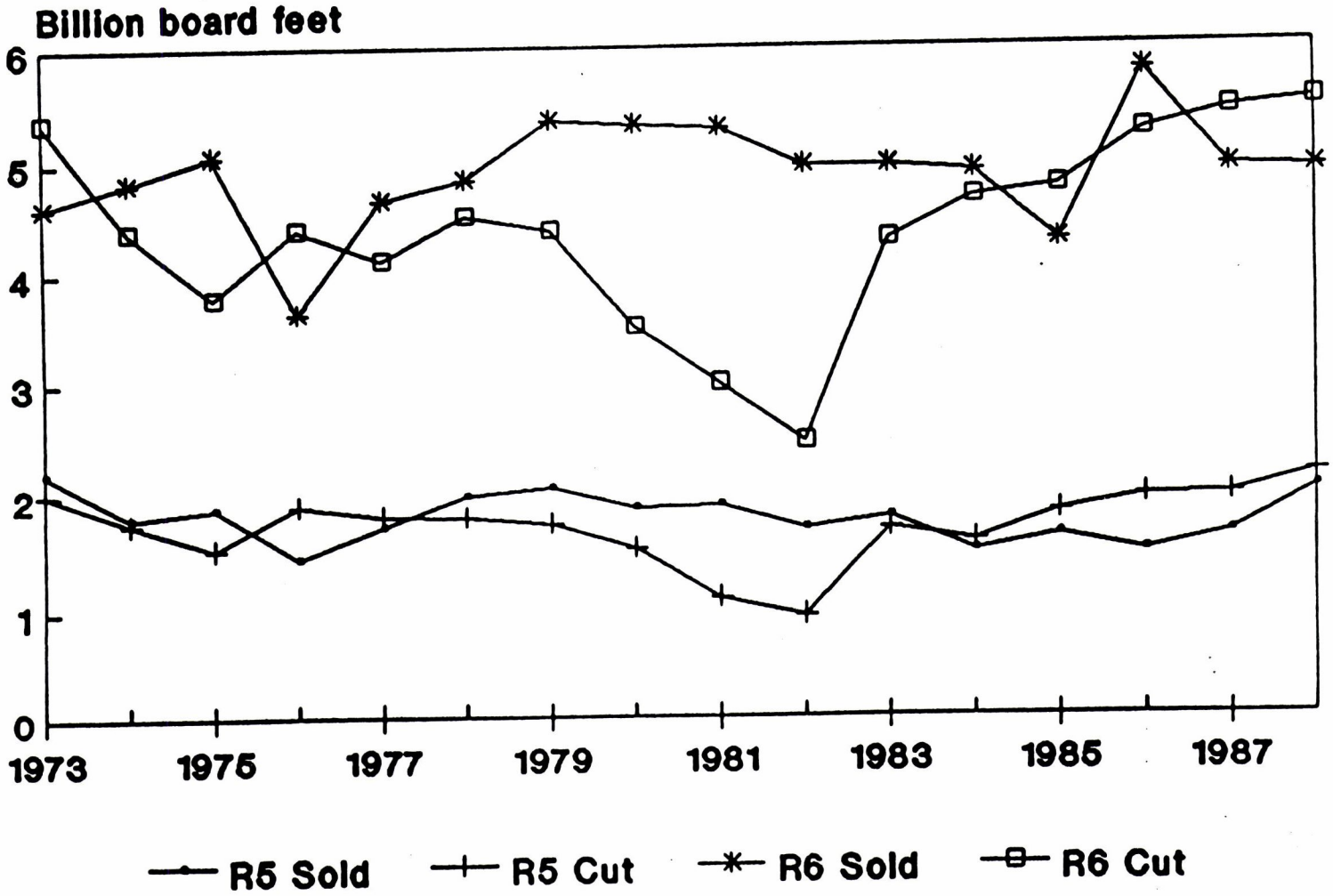
This scenario uses a timber value for projected final plans for those forests where plans are still in draft stage. These projected volumes could change up to plus or minus 10 percent in actual final plans. The mid-point of this range is used in this report in order to

Table 2 Washington and Oregon timber harvest by ownership, 1980-1989

(in million board feet, Scribner scale)

State and year	Private	State	National Forest	Bureau of Land Management	Bureau of Indian Affairs	Other public	Total
Washington:							
1980	3,507	745	1,089	0	336	43	5,720
1981	3,265	468	875	1	260	20	4,890
1982	3,740	440	728	1	152	18	5,079
1983	4,025	549	1,240	8	238	28	6,088
1984	3,545	795	1,189	2	205	66	5,802
1985	3,561	1,013	1,128	5	213	43	5,963
1986	3,989	1,064	1,232	4	235	32	6,556
1987	4,367	970	1,423	5	238	35	7,037
1988	4,406	826	1,486	0	271	56	7,045
1989 (est.)	4,670	842	1,400	0	280	50	7,242
Oregon:							
1980	3,134	186	2,399	797	105	19	6,639
1981	2,702	216	1,981	677	95	24	5,695
1982	3,440	175	1,688	312	126	17	5,758
1983	3,374	257	2,902	789	112	31	7,464
1984	3,078	249	3,164	920	101	38	7,550
1985	3,332	268	3,480	891	121	34	8,127
1986	3,494	225	3,850	1,042	104	28	8,743
1987	3,281	199	3,451	1,115	117	52	8,215
1988	3,259	270	3,487	1,439	121	39	8,615
1989 (est.)	3,487	250	3,300	1,181	125	40	8,383

Figure 5 Timber cut and sold in
Forest Service Regions 5 and 6



assess the impact of implementing the ISC strategy. In this scenario, ASQ levels by 1992 for the National Forests in the Pacific Southwest Region and for the Pacific Northwest Region are expected to be 0.6 and 3.4 billion board feet, respectively. The ASQ for the Bureau of Land Management is assumed to be unchanged from the base-line projection.

Owls

This scenario reflects estimates made by each Region of the impacts of the Spotted Owl Conservation Strategy. In this scenario, ASQ levels by 1992 for the National Forests in the Pacific Southwest Region and for the Pacific Northwest Region are expected to be 0.4 and 2.6 billion board feet, respectively. The ASQ for the Bureau of Land Management is assumed to be 0.4 billion board feet.

Logx1 and Logx2

These scenarios refer to two levels of log export restrictions. In 1989, log exports from the Washington and Oregon customs districts were 2.36 and 1.26 billion board feet, respectively. LOGX1 is a restriction of log exports from state and federal timberlands located west of the 100th Meridian and in the contiguous States. Essentially, this proposal extends the current restriction on Federal lands to include State lands. This restriction would affect from 0.6 to 1.0 billion board feet in the Douglas-fir subregion depending on the provision covering substitution. LOGX2 is a total elimination of all softwood log exports from lands west of the 100th Meridian and in the contiguous States.

Scenarios and Combinations
The specific scenarios and their combinations are:

1. Plans
2. Plans, owls
3. Plans, owls, logx1
4. Plans, owls, logx2

General Economic Framework and Expected Economic Impacts
Reductions in public harvest, relative to levels in the base scenario, would raise projected stumpage prices and stimulate some partially compensating response in private harvest. The extent and duration of this private substitution will depend on the price sensitivity of private supply and the availability of inventory above minimum harvest age.

Market equilibrium in these regional markets insure that adjustments will be made for changes in the component parts of regional timber supply functions. Four component parts are considered in regional timber supply functions. Each component part represents different collective behavior on the part of a specific ownership (National Forest, other Government [including BLM], forest industry, and other private). The two private ownerships are assumed to have different reactions in terms of responding to changes in price and available inventory levels. Harvest levels on public lands are assumed to be set by policy action rather than market forces or inventory conditions.

Economic Impacts

A general summary of projections for selected variables is given in the following tabulation. In the tabulation, regional abbreviations are: NO--North, SO--South, RK--Rocky Mountains, PNW-E--eastern Washington and Oregon, PNW-W--western Washington and Oregon, and PSW--California.

U.S. softwood lumber consumption, softwood lumber imports from Canada, softwood plywood consumption, softwood lumber price index, softwood plywood price index, softwood timber harvest, regional softwood stumpage prices, and regional production of softwood lumber and plywood for the base analysis and four scenarios, 1988, 1991, 1995, and 2000

U.S. softwood lumber consumption by base and scenario (MMBF)

	BASE	+PLANS	+OWLS	+LOGX1	+LOGX2
1988	47,922	47,922	47,922	47,922	47,922
1991	48,410	48,354	48,300	48,273	47,793
1995	47,719	47,268	46,902	46,975	47,172
2000	45,240	44,722	44,637	44,652	44,710

U.S. softwood lumber imports from Canada by base and scenario (MMBF)

	BASE	+PLANS	+OWLS	+LOGX1	+LOGX2
1988	14,885	14,885	14,885	14,885	14,885
1991	14,726	14,881	14,977	14,910	14,531
1995	13,510	13,795	14,491	14,300	13,253
2000	10,118	11,212	13,693	13,073	10,358

U.S. softwood plywood consumption by base and scenario (MMSF, 3/8")

	BASE	+PLANS	+OWLS	+LOGX1	+LOGX2
1988	19,579	19,579	19,579	19,579	19,579
1991	18,995	18,973	18,952	18,960	18,980
1995	17,921	17,800	17,810	17,750	17,747
2000	17,052	16,836	16,696	16,659	16,832

U.S. softwood lumber price index by base and scenario (1967=100)

	BASE	+PLANS	+OWLS	+LOGX1	+LOGX2
1988	123.8	123.8	123.8	123.8	123.8
1991	136.5	138.0	139.6	140.0	143.4
1995	145.7	153.0	158.7	157.5	152.0
2000	143.3	149.2	148.1	149.1	148.5

U.S. softwood plywood price index by base and scenario (1967=100)

	BASE	+PLANS	+OWLS	+LOGX1	+LOGX2
1988	99.3	99.3	99.3	99.3	99.3
1991	103.7	104.7	106.6	106.2	102.8
1995	122.0	124.2	122.6	125.4	129.0
2000	107.6	113.5	117.4	118.7	113.4

U.S. softwood timber harvest by base and scenario (MMCF)

	BASE	+PLANS	+OWLS	+LOGX1	+LOGX2
1988	7,453	7,453	7,453	7,453	7,453
1991	7,382	7,352	7,333	7,302	7,059
1995	7,289	7,191	7,063	7,054	6,985
2000	7,217	6,993	6,655	6,698	6,860

Base softwood stumpage prices by region (1967$/MBF)

	NO	SO	RK	PNW-E	PNW-W	PSW
1988	13.31	39.83	8.45	27.27	42.51	30.07
1991	13.74	41.68	8.88	36.16	52.85	48.37
1995	14.17	45.51	16.30	32.83	55.54	61.22
2000	14.35	53.74	26.07	42.80	49.19	63.67

Base + plans softwood stumpage prices by region (1967$/MBF)

	NO	SO	RK	PNW-E	PNW-W	PSW
1988	13.31	39.83	8.45	27.27	42.51	30.07
1991	13.74	42.35	10.55	50.03	57.05	53.63
1995	14.17	50.15	21.67	61.59	71.76	75.06
2000	14.35	63.27	31.23	50.80	65.98	75.35

Base + plans + owls softwood stumpage prices by region (1967$/MBF)

	NO	SO	RK	PNW-E	PNW-W	PSW
1988	13.31	39.83	8.45	27.27	42.51	30.07
1991	13.74	43.12	11.18	52.43	63.90	56.62
1995	14.17	55.46	24.73	68.88	92.95	82.83
2000	14.35	67.29	30.33	53.03	78.23	78.41

Base + plans + owls + logx1 softwood stumpage prices by region (1967$/MBF)

	NO	SO	RK	PNW-E	PNW-W	PSW
1988	13.31	39.83	8.45	27.27	42.51	30.07
1991	13.74	43.23	11.48	52.48	59.71	56.68
1995	14.17	54.02	24.36	67.16	89.03	82.75
2000	14.35	66.51	32.67	54.79	76.74	78.68

Base + plans + owls + logx2 softwood stumpage prices by region (1967$/MBF)

	NO	SO	RK	PNW-E	PNW-W	PSW
1988	13.31	39.83	8.45	27.27	42.51	30.07
1991	13.74	47.27	13.37	54.99	42.52	57.68
1995	14.17	51.58	25.38	63.57	60.98	78.40
2000	14.35	63.11	35.75	53.09	70.10	75.71

Base regional production of softwood lumber by region (MMBF)

	PNW-W	PNW-E	PSW
1988	9,322	2,884	5,179
1991	9,097	2,939	5,054
1995	8,718	3,048	4,944
2000	8,711	3,435	4,672

Base + plans regional production of softwood lumber by region (MMBF)

	PNW-W	PNW-E	PSW
1988	9,322	2,884	5,179
1991	9,050	2,824	4,929
1995	8,287	2,840	4,546
2000	7,959	2,873	4,079

Base + plans + owls regional production of softwood lumber by region (MMBF)

	PNW-W	PNW-E	PSW
1988	9,322	2,884	5,179
1991	8,896	2,816	4,882
1995	7,203	2,852	4,395
2000	6,035	2,820	3,755

Base + plans + owls + logx1 regional production of softwood lumber (MMBF)

	PNW-W	PNW-E	PSW
1988	9,322	2,884	5,179
1991	9,059	2,818	4,884
1995	7,635	2,835	4,389
2000	6,638	2,846	3,775

Base + plans + owls + logx2 regional production of softwood lumber (MMBF)

	PNW-W	PNW-E	PSW
1988	9,322	2,884	5,179
1991	10,613	2,853	4,877
1995	10,728	2,828	4,289
2000	10,664	2,871	3,776

Base regional production of softwood plywood (MMS, 3/8")

	PNW-W	PNW-E	PSW
1988	7,638	768	196
1991	7,308	691	169
1995	6,799	691	221
2000	6,023	695	185

Base + plans regional production of softwood plywood (MMSF,3/8")

	PNW-W	PNW-E	PSW
1988	7,638	768	196
1991	7,286	674	168
1995	6,571	558	215
2000	5,384	596	182

Base + plans + owls regional production of softwood plywood (MMSF,3/8")

	PNW-W	PNW-E	PSW
1988	7,638	768	196
1991	7,232	679	171
1995	6,093	572	196
2000	4,657	603	194

Base + plans + owls + logx1 regional production of softwood plywood (MMSF,3/8")

	PNW-W	PNW-E	PSW
1988	7,638	768	196
1991	7,276	674	164
1995	6,255	560	209
2000	4,788	598	197

Base + plans + owls + logx2 regional production of softwood plywood (MMSF,3/8")

	PNW-W	PNW-E	PSW
1988	7,638	768	196
1991	7,472	654	150
1995	7,031	451	206
2000	5,996	476	183

The various scenarios were constructed by assuming that reductions in Federal harvest flows started in FY1991 and that policy changes took effect in 1991. For most variables, there are only small impacts in FY1991 because of remaining Federal timber under contract and the speed of most economic adjustment processes. It takes several years for the declines in National Forest harvest flows to reach their full economic impacts. Immediate reactions to implementation of the ISC report are difficult to estimate because of the uncertainty as to how the implementation may be carried out.

Plans Scenario

Compared with the base projection, harvest levels from National Forests in the three West Coast States decline 18 percent. These harvest declines lead to increases in stumpage prices. Higher stumpage prices reduce the competitiveness of producers in the Pacific Northwest and Pacific Southwest regions relative to producers in other regions, thereby forcing downward adjustments in regional lumber and plywood production. Falling lumber and plywood production eventually lead to lower stumpage prices. In the face of rising wood costs, the region's competitive position deteriorates, profits fall, and solidwood output and capacity decline. By the mid 1990's, lumber output in the plans scenario is 1.0 billion board feet below the level in the base projection. Plywood production is also lower.

These higher stumpage prices lead to higher harvest on private timberlands, especially in the Pacific Northwest region, that offset some of the reduction in Federal harvest. In 1995, 18 percent of the reduction in Federal harvest is offset in the Pacific Southwest Region and 51 percent for the Pacific Northwest Region.

In the Pacific Northwest Region, private timberland owners are unable to sustain harvest increases (stimulated by higher prices in the early 1990's) past 1995.

Harvest reductions in the Pacific Southwest and Pacific Northwest Regions have only modest impacts on other domestic regions and final product markets. While there is some response to higher product prices, the bulk of the long-term adjustment is borne within the two regions and by lower domestic consumption and expanded lumber imports. By 2000, lumber prices are 4 percent higher while consumption is 1 percent lower.

Plans Plus Owls Scenario

This scenario includes additional reductions resulting from implementation of the ISC recommendations. These harvest declines lead to rapid increases in stumpage prices. Higher stumpage prices reduce the competitiveness of producers in the Pacific Northwest and Pacific Southwest regions relative to producers in other regions, thereby forcing downward adjustments in regional lumber and plywood production. Rapidly falling lumber and plywood production eventually lead to lower stumpage prices. In the Douglas-fir subregion, stumpage price growth accelerates from roughly 1.2 percent in the base projection to 4.6 percent in the plans plus owls scenario. In the face of rising wood costs, the region's competitive position deteriorates, profits fall, and solidwood output and capacity drop. By the mid 1990's, lumber output is below the levels in the base projection. Plywood production is also lower.

Higher stumpage prices lead to higher harvest on private timberlands that offset some of the reduction in Federal harvest especially in the Pacific Northwest region. Table 3 shows the same information as Table 1 for Federal lands, but also shows the expected timber harvest response on private lands. In total, the increase in private harvest by 1995 would offset about half the reduction in Federal harvest. However, this level of harvest could not be sustained on private lands, and by 2000 the harvest reduction on Federal and private lands combined will be about 10 percent greater than on Federal lands alone.

In the Pacific Northwest Region, private timberland owners are unable to sustain harvest increases (stimulated by higher prices in the early 1990's) past 1995. Forest industry harvest levels for this scenario fall below the levels for the base projection by 2000.

Harvest reductions in the Pacific Southwest and Pacific Northwest Regions have only modest impacts on other domestic regions and final product markets. While there is some response to higher product prices, the bulk of the long-term adjustment is borne within the two regions and by lower domestic consumption and expanded lumber imports. The most severe impacts within the two regions are in the lumber industry where production falls by 30 percent by 2000. This amounts to a loss of 4.2 billion board feet of production in the Pacific Southwest and Pacific Northwest Regions combined. This reduced production leads to increased imports from Canada (3.6 billion board feet), slight increases in production of other U.S. regions, and a drop in U.S. consumption of 0.6 billion board feet. Southern lumber production while increasing early in the decade (0.3 billion board feet in 1995) cannot sustain those increases. By 2000, lumber prices are 3 percent higher while consumption is 1 percent lower.

Plans Plus Owls Plus Logx1 Scenario

This scenario assumes implementation of elimination of softwood log exports from public lands west of the 100th Meridian. In this scenario, log exports were reduced by 500 million board feet because of restrictions on timber from state timberlands. We assumed further that this reduction would lead to a slight increase in both log exports from private timberlands and lumber exports from the region.

The restriction does lead to lower stumpage prices, decreased lumber imports from Canada, and increased lumber production in the Douglas-fir subregion--6 percent by 1995 as compared with the plans plus owls scenario. Its impacts are almost all in the Douglas-fir subregion, but within the subregion its impacts are most evident in western Washington.

Plans Plus Owls Plus Logx2 Scenario

This scenario assumes a complete restriction of log exports from both public and private timberlands west of the 100th Meridian and in the contiguous States. These log export restrictions were assumed to be implemented in 1991. The impact of this scenario focuses almost completely on western Washington and western Oregon that in 1988 accounted for 86 percent of the total log exports.

Such a restriction would lead to a significant increase in regional competitiveness of the Douglas-fir subregion relative to other producing regions. Stumpage prices drop by a third relative to the plans plus owls scenario and to just slightly more than those in the base plus plans scenario. Stumpage prices in the rest of the Pacific Northwest and Pacific Southwest Regions drop by smaller amounts. In this scenario, these lower stumpage prices lead to increased regional and national lumber production, increased lumber exports (partly to offset the loss in log exports), and reductions in lumber imports relative to the plans plus owls scenario.

In this scenario, we assumed that lumber exports increased during the 1990's by 2 billion board feet from the Douglas-fir subregion. Lumber imports from Canada fall from the levels associated with the plans and plans plus owls scenarios to about those levels observed in the base scenario. Lumber production in the Douglas-fir subregion increases by 50 percent over the levels achieved in the plans plus owls scenario and 23 percent over the base scenario. This simulation improves the competitive position of the Douglas-fir region relative to the the rest of Washington and Oregon and California where lumber production drops slightly.

Table 3--Volume of Timber Offered for Sale on Federal Lands and Private Harvest Response After Implementation of the Interagency Scientific Committee Conservation Strategy.

Forests and Districts Affected by ISC Strategy	Current Plans	Actual or Projected Final Plans		Actual or Projected Final Plans plus ISC Strategy	
	1995	2000	1995	2000	
			(Million Board Feet)		
Washington National Forests					
Gifford Pinchot 1/	388	334	334	189	189
Mt. Baker-Snoqualmie 1/	170	108	108	45	45
Okanogan 1/	63	63	63	59	59
Olympic 1/	186	111	111	43	43
Wenatchee	136	136	136	83	83
Subtotal	943	752	752	419	419
Oregon National Forests					
Deschutes 1/	202	100	100	91	91
Mt. Hood 1/	255	193	193	154	154
Rogue River 1/	137	120	120	85	85
Siskiyou	160	160	160	119	119
Suislaw 1/	335	335	335	198	198
Umpqua 1/	340	334	334	273	273
Willamette 1/	568	491	491	333	333
Winema 1/	199	115	115	110	110
Oregon BLM Districts					
Salem	239	239	239	62	62
Eugene	223	223	223	59	59
Roseburg	247	247	247	103	103
Medford	213	213	213	123	123
Coos Bay	254	254	254	96	96
Subtotal	3,385	3,024	3,024	1,805	1,805
California National Forests					
Klamath 1/	200	142	142	110	110
Mendocino 1/	93	84	84	58	58
Shasta-Trinity 1/	226	224	224	132	132
Six Rivers 1/	175	150	150	92	92
California BLM District					
Ukiah	9	9	9	3	3
Subtotal	699	609	609	395	395
Total Public	5,027	4,385	4,385	2,619	2,619
Private Lands 2/					
Western Washington & Oregon	7,235	7,505	7,270	7,820	6,940
Eastern Washington & Oregon	630	935	650	1,005	665
California	2,115	2,240	2,140	2,300	2,115
	9.980	10,680	10,060	11,125	9,720

1/ The timber volume shown for projected final plans in these forests could change up to plus or minus 10 percent in actual final plans. A mid-point of this range is shown in order to assess the impact of implementing the ISC strategy.

2/ Actual harvest shown for private lands in the "current plans" column.

NOTE: Final BLM new plan sale levels will not be known until the new plans are completed in 1992. Existing plan levels are carried into years 1995 and 2000 for comparative purposes only.

REGIONAL AND LOCAL EFFECTS

Background

This section of the report presents:

- o Estimated effects on employment caused by changes in timber harvest levels on National Forests and BLM Districts assuming full implementation of the ISC Strategy.
- o Estimated changes in Federal revenue from National Forests and BLM Districts assuming full implementation of the ISC Strategy.
- o Estimated changes in payments to States and counties from Federal revenues generated on National Forests and BLM Districts assuming full implementation of the ISC Strategy.

Employment is affected by technology and other factors that change over time. The employment multipliers used in this study represent past gains in efficiency; however, no attempt was made to project this into the future. The emphasis is on change in employment from reduced timber availability; potential future gains in efficiency would apply to any level of timber supply. This information was developed using historical relationships. The IMPLAN input-output economic modeling system was the primary tool used in the analysis.

Number of jobs was estimated in two steps. First, the change in the demand for processed wood materials using harvested timber was estimated. Second, changes in employment associated with meeting this level of demand were estimated. The second step, estimating jobs, involved the use of the IMPLAN economic modeling system.

The first step, estimating the demand for products manufactured and exported from a "local" area per million board feet of timber harvested, used the value of products sold by sawmills as the primary information source. The product values were based upon timber appraisal estimates from detailed mill studies periodically performed by the Forest Service. The value of products per unit of harvest multiplied by the harvest level was used as the estimate of demand for wood products.

The second step, estimating the number of jobs affected by meeting the demand for wood products, was accomplished using a model called IMPLAN. The IMPLAN system is a software and database package that scales the national input-output model of the U.S. economy built by the U.S. Department of Commerce's Bureau of Economic Analysis down to fit a desired grouping of counties. Primary data used to scale the national model down to fit local areas are the data series from the various economic censuses taken by the U.S. Department of Commerce and payroll and employment data collected by the States and reported to the Department of Commerce. Supplemental data compiled by Dun and Bradstreet are also used in this process.

IMPLAN models are general economic "input-output" systems used to estimate the economic consequences of delivering products to meet demand by tracing supply requirements backward through all affected business linkages. At each stage of these backward linkages, persons are employed to produce the required products. IMPLAN models are usually constructed for a "local" economy (individual or groups of counties) affected by the activities of a particular National Forest. As a result, not all possible supply linkages are contained in these "local" economies. The total number of jobs gained or lost as a result

of various levels of harvest from the National Forests are estimated as the sum of all jobs affected in the "local" economy through the backward supply linkages needed to deliver wood products to export (final) demand.

The information presented here includes the employment effects of processing the timber harvest through the economy. These effects can be estimated in three components:

- o The direct effect on the sector(s) either exporting processed wood products from the economic area or selling these products to final consumers within the area,
- o The indirect effect on the other production, trade and service sectors within the economy that provide the successive rounds of production inputs needed to manufacture the processed wood products sold to export or final consumption, and
- o The induced effect of the consumer spending within the economic area associated with the jobs supporting the direct and indirect production.

The models were used to develop the relationship between the processing of the timber harvest and the total employment supported by it. These relationships provide a way to examine the employment implications of the expected harvest. Two factors could alter these estimates. First, the mix of future processing (lumber, plywood, pulp, log exports, etc.) is not known. In addition, the multipliers are based upon past production technology which will continue to change in the future, changing the relationship between timber harvest and the number of jobs supported. Improvements in processing efficiency have continually reduced the labor requirements per million board feet of timber and these improvements are expected to continue into the future.

Economic Areas

Economic areas made up of groups of counties were identified for each forest and District with spotted owls. An IMPLAN model was constructed for each of these economic areas. The rule used to delineate these areas in Washington and Oregon was that approximately 80 percent of the Forests' timber harvest historically has received primary processing within the area. Primary processing is defined as plywood and veneer, lumber, particle board, and other similar manufacturing. In California, a similar rule based on log flows to mills and the relative importance to local mills was used.

In Washington and Oregon, the Forests and Districts economic areas are:

Forest Service

o Mt. Baker-Snoqualmie - Whatcom, Skagit, Snohomish, King, and Pierce Counties, Washington.

o Olympic - Clallam, Jefferson, Grays Harbor, and Mason Counties, Washington

o Gifford Pinchot - Lewis, Cowlitz, Clark, Skamania, and Klickitat Counties, Washington.

o Okanogan - Okanogan County, Washington.

o Wenatchee - Chelan, Kittitas, Yakima, and Douglas Counties, Washington

o MT. Hood - Multnomah, Clackamas, Hood River, and Wasco Counties, Oregon.

o Siuslaw - Tillamook, Polk, Lincoln, Benton, and Lane Counties, Oregon.

o Willamette - Marion, Linn, and Lane Counties, Oregon.

o Umpqua - Douglas County, Oregon.

o Siskiyou- Coos, Curry, Josephine, and Jackson Counties, Oregon.

o Rogue River - Jackson, and Josephine Counties, Oregon.

o Winema - Klamath County, Oregon.

o Deschutes - Deschutes County, Oregon.

Bureau of Land Management

o Salem - Benton, Clackamas, Columbia, Lincoln, Linn, Marion, Multnomah, Polk, Tillamook, Washington, and Yamhill Counties, Oregon.

o Eugene - Lane County, Oregon.

o Roseburg - Douglas County, Oregon.

o Coos Bay - Coos and Curry Counties, Oregon.

o Medford and Lakeview - Jackson, Josephine, and Klamath Counties, Oregon.

California

In California, economic effects are centered in the north coast and north central areas of the State. The north coast area affected includes Del Norte, Humboldt, and Mendocino counties. The north central area most affected includes Glenn, Tehama, Shasta, Trinity, and Siskiyou counties. The Six Rivers National Forest primarily affects the north coast area. The Mendocino National Forest affects both the north coast and north central areas. The Klamath and Shasta-Trinity National Forests primarily affect the north central area. A major portion of the timber from the Klamath National Forest is milled in southern Oregon counties.

Employment Effects

Table 4 displays projected employment effects. Effects are shown in two steps. The first step is the employment effect expected from implementing the projected final plans for the Forest Service and existing plans for the Bureau of Land Management. The second step shows employment effects after implementing the ISC Recomendations on affected National Forests and BLM Districts.

Implementation of the estimated final plans for the Forest Service would result in a decline in employment of 6,247 people. Implementation of the ISC Recommendations would result in a further decline of 19,162 people for a total decline in employment of 25,409 people for the three West Coast States as compared with estimated employment at the level associated with current plans. It is important to keep in mind that these employment estimates are for both direct and indirect employment associated with timber harvest on just those National Forests and BLM Districts affected by the ISC Recommendations. It does not include private and other public ownerships, nor does it include Forest Service and BLM lands not affected by the ISC Conservation Strategy.

Table 4--Timber-Based Employment After Implementation of the Interagency Scientific Committee Conservation Strategy

Forests and Districts Affected by ISC Strategy	Current Plans	Actual or Projected Final Plans		Actual or Projected Final Plans plus ISC Strategy	
	1995	1995	2000	1995	2000
		(Number of Jobs)			
Washington National Forests					
Gifford Pinchot[1/]	4,687	4,035	4,035	2,283	2,283
Mt. Baker-Snoqualmie[1/]	1,943	1,234	1,234	514	514
Okanogan	592	592	592	555	555
Olympic[1/]	1,843	1,100	1,100	426	426
Wenatchee	1,452	1,452	1,452	886	886
Subtotal	10,518	8,414	8,414	4,665	4,665
Oregon National Forests					
Deschutes[1/]	1,380	683	683	615	615
Mt. Hood[1/]	2,924	2,106	2,106	1,680	1,680
Rogue River[1/]	1,345	1,178	1,178	835	835
Siskiyou	1,872	1,872	1,872	1,392	1,392
Siuslaw	4,087	4,087	4,087	2,416	2,416
Umpqua[1/]	3,492	3,430	3,430	2,804	2,804
Willamette[1/]	6,157	5,322	5,322	3,610	3,610
Winema[1/]	1,485	858	858	821	821
Oregon BLM Districts					
Salem	2,470	2,470	2,470	641	641
Eugene	4,473	4,473	4,473	654	654
Roseburg	2,612	2,612	2,612	1,089	1,089
Medford	2,525	2,525	2,525	1,458	1,458
Coos Bay	2,300	2,300	2,300	869	869
Subtotal	35,122	31,918	31,918	18,884	18,884
California National Forests					
Klamath[1/]	1,980	1,420	1,420	1,100	1,100
Mendocino[1/]	809	731	731	505	505
Shasta-Trinity[1/]	2,621	2,621	2,621	1,544	1,544
Six Rivers[1/]	2,100	1,800	1,800	1,104	1,104
California BLM District					
Ukiah	90	90	90	30	30
Subtotal	7,600	6,662	6,662	4,283	4,283
Total	53,240	46,993	46,993	27,831	27,831

[1/] Numbers for projected final plans for these forests are based on projected timber volumes that could change up to plus or minus 10 percent in actual final plans. The numbers are based on a midpoint of this range in order to assess the impact of implementing the ISC strategy.

NOTE: Final BLM new plan sale levels will not be known until the new plans are completed in 1992. Existing plan levels are carried into years 1995 and 2000 for comparative purposes only.

For comparison, in 1988 about 250,000 people were employed in the forest products industries in Washington, Oregon, and California. Employment figures shown in this report include direct industry employment and jobs that support this direct employment. Estimates range from 40-60 percent of total employment that could be classified as forest industry employment. Therefore, roughly, half of the employment figures shown here, about 12-13,000 jobs, are forestry industry. For perspective, this would account for 5 percent of total industry employment in the three States. However, since employment impacts are concentrated in certain areas, the percentage would be much greater in these localities.

On a State-by-State basis, the largest loss of jobs from Federal harvest reductions will be in the State of Oregon; 16,238 fewer jobs will be available. In Washington, employment will decline by 5,853 jobs; and in California, job loss will total 3,317.

Based on available inventories, an increase in harvest on private lands could be expected during the early 1990's in response to higher stumpage prices. Table 5 shows that this private response could provide employment for 12,137 people in 1995. However, by the year 2000 the capability of private lands to offset reductions in Federal timber harvest will have been exhausted, and the net effect will be employment levels even lower than the initial impact caused by reduced Federal harvests. Employment as compared with current planned levels of harvest on Federal lands will be down an addition 2,756 people in the year 2000. Thus, harvest response on private lands will mitigate the employment impact in 1995 to a loss of 13,272 jobs; but by 2000, the loss will be even greater than from Federal harvest reductions alone and losses will total 28,165 jobs.

An additional increment of reduced employment is expected to occur in the Federal sector. The Forest Service estimates that employment would be reduced by about 1,300 positions in Washington and Oregon and about 200 positions in California. The Bureau of Land Management should not be greatly affected in the near future (through 1992) due to the need for redesigning proposed sales, backlog on reforestation and timber stand improvement work, and developing land use plans. As the land use plans are completed, further impacts on employment will be analyzed. Reduction in Federal employment is a significant consideration. Many of these people live and work in the same rural communities where forest industries are a dominant part of the economy. Their loss will place an added burden on communities.

As the figures indicate, no subarea fares well. All may experience significant reductions in their employment base. It is difficult to point to any single area or community as being particularly adversely affected so widespread are the effects. When the Forest Service and BLM potential harvest reductions are looked at together, it is obvious that Oregon, starting with the west central area to the foothills of the Cascades and southward to the California state line, will be faced with significant economic disruption. The combined effect of the Willamette, Siuslaw, and Umpqua National Forests and the Eugene, Salem, and Roseburg Districts of the Bureau of Land Management harvest reductions may affect 12,000 jobs. The combined effect of FS and BLM reductions in the Southwestern Oregon coast and Rogue River Valley may affect an additional 3,500 jobs.

In Washington, starting with the Olympic Peninsula and continuing southward and westward to the Cowlitz River Valley and into the Columbia Gorge, about 3800 jobs may be affected. While the effects in Northwest Washington may be more widely dispersed through areas with significantly diverse economies and urban populations, the reduction in jobs will significantly affect individual communities in the rural areas.

Table 5--Changes in Timber-Based Employment That Would Result from Implementation of the Northern Spotted Owl Conservation Strategy

	Change from Current Level With Implementation of ISC Strategy	
	1995	2000
	(Number of Jobs)	
Washington		
Forest Service	-5,853	-5,853
Bureau of Land Mgmt.		
Total	-5,853	-5,853
Oregon		
Forest Service	-8,569	-8,569
Bureau of Land Mgmt.	-7,669	-7,669
Total	-16,238	-16,238
Northern California		
Forest Service	-3,257	-3,257
Bureau of Land Mgmt.	-60	-60
Total	-3,317	-3,317
Total Public	-25,409	-25,409
Private lands		
Western WA & OR	+6,201	-3,127
Eastern WA & OR	+3,975	+371
California	+1,961	------
Total	+12,137	-2,756
Net Change	-13,272	-28,165

Employment effects in California are centered in the north coast and north central areas of the State. Private timber supplies account for approximately 85 percent of the logs available to mills in the north coast area, while federal timber supplies account for 15 percent. In the north central area, federal supplies account for about 50 percent of the logs available to mills. As a result, overall employment effects will be felt more strongly in this area. Individual companies without access to private timber supplies will be particularly affected in both areas.

Employment effects will be more intense in Trinity and Siskiyou Counties than in the other affected counties in California. Employment related to the harvesting and processing of federal timber are a much larger share of the total economy in these two counties than in other affected counties. In these two counties, employment related to the processing of Federal timber accounts for between 10 and 20 percent of total employment.

Timber-based Revenues

Timber harvest throughout the area is an important source of Federal revenue. Table 6 shows estimates of timber-based revenue to the US Treasury. These estimates were made using recent prices and projected changes in stumpage prices from the TAMM analysis discussed previously. The possible reductions in Federal harvest caused by implementation of the ISC Recommendations are large and, as a result, significant increases in stumpage prices are expected. The analysis shows that implementation of the ISC recommendation by the Forest Service and BLM would reduce timber-based revenue by about $148 million in the three West Coast States in 1995, and $229 million in 2000.

Revenues would decline about $28 million from Forest Service lands and $120 million from Bureau of Land Management lands in 1995. In 2000, the decline in revenues from Forest Service lands would be $99 million and on Bureau of Land Management lands, $130 million.

Future economic conditions are uncertain; therefore, for comparison Table 7 shows revenues from Federal timber harvest assuming no change in price during the entire decade. Under this scenario, implementation of the ISC recommendation would have a larger downward effect on revenues because there is no price offset to volume reductions. In total, revenues to the Treasury would decline by $501 million in 1995 and 2000 (both price and volume are constant after 1995).

Payments to States

Revenue sharing, commonly refered to as "payments to States," is estimated using projected changes in harvest, and forest- or district- specific long-term stumpage prices. Total revenue is estimated for each forest or district, and county shares within each State are estimated based on the percent of a National Forest's acreage in each county or established O&C ratios. It is important to remember that, for the purposes of this report, the only payments to States that are considered are those associated with National Forests and BLM Districts affected by the ISC Recommendations.

Table 6--Timber-Based Revenue After Implementation of the Interagency Scientific Committee Conservation Strategy--Rising Price Assumption

Forests and Districts Affected by ISC Strategy	Current Plans	Actual or Projected Final Plans		Actual or Projected Final Plans plus ISC Strategy	
	1995	1995	2000	1995	2000
		(Millions of 1989 Dollars)			
Washington National Forests					
Gifford Pinchot 1/	71	79	82	58	55
Mt. Baker-Snoqualmie 1/	32	26	27	14	13
Okanogan 1/	7	12	8	13	8
Olympic 1/	27	21	22	11	10
Wenatchee	15	28	18	19	11
Subtotal	151	166	156	114	97
Oregon National Forests					
Deschutes 1/	22	21	13	21	12
Mt. Hood 1/	53	50	51	51	49
Rogue River 1/	26	29	31	27	26
Siskiyou	37	48	50	46	44
Siuslaw 1/	85	109	113	84	80
Umpqua 1/	76	97	101	102	97
Willamette 1/	125	139	144	122	116
Winema 1/	42	46	29	49	29
Oregon BLM Districts					
Salem	73	94	98	32	30
Eugene	68	88	92	30	29
Roseburg	50	64	67	35	33
Medford	45	59	61	44	42
Coos Bay	69	89	92	44	41
Subtotal	773	933	942	686	628
California National Forests					
Klamath 1/	21	18	18	16	14
Mendocino 1/	11	12	12	9	9
Shasta-Trinity 1/	38	46	44	30	27
Six Rivers 1/	29	31	29	21	19
California BLM District					
Ukiah	1	2	2	1	1
Subtotal	100	109	105	76	69
Total	1024	1208	1203	876	795

1/ Numbers for projected final plans for these forests are based on projected timber volumes that could change up to plus or minus 10 percent in actual final plans. The numbers are based on a midpoint of this range in order to assess the impact of implementing the ISC strategy.

NOTE: Final BLM new plan sale levels will not be known until the new plans are completed in 1992. Existing plan levels are carried into years 1995 and 2000 for comparative purposes only.

Table 7--Timber-Based Revenue After Implementation of the Interagency Scientific Committee Conservation Strategy - Constant Price Assumption

Forests and Districts Affected by ISC Strategy	Current Plans	Actual or Projected Final Plans		Actual or Projected Final Plans plus ISC Strategy	
	1995	1995	2000	1995	2000
	(Millions of 1989 Dollars)				
Washington National Forests					
Gifford Pinchot 1/	71	61	61	35	35
Mt. Baker-Snoqualmie 1/	32	20	20	8	8
Okanogan 1/	7	7	7	6	6
Olympic 1/	27	16	16	6	6
Wenatchee	15	15	15	9	9
Subtotal	151	119	119	64	64
Oregon National Forests					
Deschutes 1/	22	11	11	10	10
Mt. Hood 1/	53	38	38	31	31
Rogue River 1/	26	23	23	16	16
Siskiyou	37	37	37	28	28
Suislaw 1/	85	85	85	50	50
Umpqua 1/	76	75	75	61	61
Willamette 1/	125	108	108	73	73
Winema 1/	42	25	25	23	23
Oregon BLM Districts					
Salem	73	73	73	19	19
Eugene	68	68	68	18	18
Roseburg	50	50	50	21	21
Medford	45	45	45	26	26
Coos Bay	69	69	69	26	26
Subtotal	773	707	707	402	402
California National Forests					
Klamath 1/	21	15	15	12	12
Mendocino 1/	11	10	10	7	7
Shasta-Trinity 1/	38	38	38	22	22
Six Rivers 1/	29	25	25	15	15
California BLM District					
Ukiah	1	1	1	1/	1/
Subtotal	100	89	89	56	56
Total	1,024	915	915	523	523

1/ Less than one million.

1/ Numbers for projected final plans for these forests are based on projected timber volumes that could change up to plus or minus 10 percent in actual final plans. The numbers are based on a midpoint of this range in order to assess the impact of implementing the ISC strategy.

NOTE: Final BLM new plan sale levels will not be known until the new plans are completed in 1992. Existing plan levels are carried into years 1995 and 2000 for comparative purposes only.

With Stumpage Price Increase

Table 8 shows estimates of payments to States in 1995 for implementation of the ISC Recommendations by the Forest Service and the Bureau of Land Management.

The following tabulation shows changes in payments at the State level for 1995 and 2000. This change reflects the reduction in timber harvest from current planning levels to the level in the ISC Conservation Strategy, and accounts for the expected rise in stumpage prices as a result of this harvest reduction.

	Washington	Oregon	California	Total
	----------(million dollars)----------			
		1995		
Forest Service	-9.4	+6.9	-5.2	-7.7
Bureau of Land Management	----	*-66.0*	*1/*	*-66.0*
Total	-9.4	-59.1	-5.2	-73.7
		2000		
Forest Service	-13.3	-4.5	-6.6	-24.4
Bureau of Land Management	----	*-70.6*	*1/*	*-70.6*
Total	-13.3	-75.1	-6.6	-95.0

1/ Less than $0.1 million.

Because of the larger proportional payments by the BLM (O&C lands), 50 percent of receipts as compared with 25 percent by the Forest Service, and because of the large timber volume reductions on BLM lands, most of the loss in payments to States is from the BLM. Forest Service payments actually show an increase in Oregon in 1995 due to the sharp expected increase in stumpage prices. In total, payments to the three States are expected to be about $74 million lower in 1995 and $95 million lower in 2000. About 80 percent of the reduction will be in the State of Oregon.

Without Stumage Price Increase

The previous analysis is based on an assumed significant rise in stumpage prices associated with a reduction in the volume of Federal timber available for harvest. For comparison, Table 9 and the following tabulation show the comparable statistics using no change in stumpage prices from the 1989 average harvest value.

Table 8--Payments to States After Implementation of the Interagency Scientific Committee Conservation Strategy--Rising Price Assumption

	Current Plans	Final Plans		Final Plans plus ISC Strategy	
	1995	1995	2000	1995	2000
	(Thousands of 1989 Dollars)				
Washington National Forests					
Gifford Pinchot[1/]	16,976	18,851	19,582	13,810	13,148
Mt. Baker-Snoqualmie[1/]	7,469	6,121	6,359	3,302	3,144
Okanogan[1/]	1,553	2,920	1,848	3,054	1,803
Olympic[1/]	7,264	5,592	5,809	2,804	2,670
Wenatchee	3,234	6,080	3,849	4,145	2,448
Subtotal	36,496	39,565	37,446	27,115	23,213
Oregon National Forests					
Deschutes[1/]	4,571	4,254	2,693	4,277	2,525
Mt. Hood[1/]	11,354	10,548	10,957	10,896	10,374
Rogue River[1/]	5,568	6,291	6,535	5,769	5,493
Siskiyou	6,951	8,967	9,314	8,633	8,220
Siuslaw[1/]	21,267	27,435	28,498	20,992	19,986
Umpqua[1/]	13,017	16,495	17,134	17,454	16,618
Willamette[1/]	26,551	29,608	30,755	25,995	24,750
Winema[1/]	10,062	10,932	6,920	11,680	6,897
Oregon BLM Districts					
Salem	38,809	50,064	52,004	16,813	16,007
Eugene	35,575	45,892	47,670	15,718	14,965
Roseburg	25,873	33,376	34,669	18,018	17,154
Medford	24,256	31,290	32,502	23,391	22,271
Coos Bay	37,192	44,478	46,202	21,763	20,720
Subtotal	261,045	319,628	325,855	201,399	185,981
California National Forests					
Klamath[1/]	4,229	3,731	3,579	3,172	2,890
Mendocino[1/]	2,494	2,771	2,658	2,100	1,913
Shasta-Trinity[1/]	8,204	10,091	9,681	6,527	5,947
Six Rivers[1/]	6,991	7,371	7,071	4,962	4,521
California BLM District					
Ukiah	54	67	64	24	22
Subtotal	21,973	24,030	23,053	16,785	15,293
Total	319,514	383,223	386,354	245,299	224,487

[1/] Numbers for projected final plans for these forests are based on projected timber volumes that could change up to plus or minus 10 percent in actual final plans. The numbers are based on a midpoint of this range in order to assess the impact of implementing the ISC strategy.

NOTE: Final BLM new plan sale levels will not be known until the new plans are completed in 1992. Existing plan levels are carried into years 1995 and 2000 for comparative purposes only.

Table 9--Payments to States After Implementation of the Interagency Scientific Committee Conservation Strategy--Constant Price Assumption

	Current Plans	Final Plans		Final Plans plus ISC Strategy	
	1995	1995	2000	1995	2000
	(Thousands of 1989 Dollars)				
Washington National Forests					
Gifford Pinchot 1/	16,976	14,614	14,614	8,269	8,269
Mt. Baker-Snoqualmie 1/	7,469	4,745	4,745	1,977	1,977
Okanogan 1/	1,553	1,553	1,553	1,454	1,454
Olympic 1/	7,264	4,335	4,335	1,679	1,679
Wenatchee	3,234	3,234	3,234	1,974	1,974
Subtotal	36,496	28,481	28,481	15,354	15,354
Oregon National Forests					
Deschutes 1/	4,571	2,263	2,263	2,036	2,036
Mt. Hood 1/	11,354	8,177	8,177	6,525	6,525
Rogue River 1/	5,568	4,877	4,877	3,455	3,455
Siskiyou	6,951	6,951	6,951	5,170	5,170
Suislaw 1/	21,267	21,267	21,267	12,570	12,570
Umpqua 1/	13,017	12,787	12,787	10,452	10,452
Willamette 1/	26,551	22,952	22,952	15,566	15,566
Winema 1/	10,062	5,815	5,815	5,562	5,562
Oregon BLM Districts					
Salem	38,809	38,809	38,809	10,068	10,068
Eugene	35,375	35,575	35,575	9,412	9,412
Roseburg	25,873	25,873	25,873	10,789	10,789
Medford	24,256	24,256	24,256	14,007	14,007
Coos Bay	37,192	37,192	37,192	14,057	14,057
Subtotal	261,044	246,792	246,792	119,667	119,667
California National Forests					
Klamath 1/	4,229	3,033	3,033	2,350	2,350
Mendocino 1/	2,494	2,252	2,252	1,555	1,555
Shasta-Trinity 1/	8,204	8,204	8,204	4,835	4,835
Six Rivers 1/	6,991	5,992	5,992	3,675	3,675
California BLM District					
Ukiah	54	54	54	18	18
Subtotal	21,973	19,537	19,537	12,433	12,433
Total	319,514	294,810	294,810	147,454	147,454

1/ Numbers for projected final plans for these forests are based on projected timber volumes that could change up to plus or minus 10 percent in actual final plans. The numbers are based on a midpoint of this range in order to assess the impact of implementing the ISC strategy.

NOTE: Final BLM new plan sale levels will not be known until the new plans are completed in 1992. Existing plan levels are carried into years 1995 and 2000 for comparative purposes only.

	Washington	Oregon	California	Total
		(million dollars)		
		1995		
Forest Service	-21.1	-38.0	-9.5	-68.6
Bureau of Land Management	---	*-103.9*	*1/*	*-103.4*
Total	-21.1	-141.4	-9.5	-172.0
		2000		
Forest Service	-21.1	-38.0	-9.5	-68.6
Bureau of Land Management	---	*-103.4*	*1/*	*-103.4*
Total	-21.1	-141.4	-9.5	-172.0

1/ Less than $0.1 million.

With this constant price scenario, the decline in payments to States would be almost double the amount shown with rising prices. Slightly more than 80 percent of this decline would occur in the State of Oregon and in that State, three-quarters of the reduction would be attributed to BLM lands.

Table 10 demonstrates the distribution of payments to counties using the rising price assumption in 1995. The table shows the relative magnitude of impacts by county for Washington and Oregon. While these distributions are based on the timber volume distribution in 1995 at rising prices, the table can be used to estimate proportionally county-by-county impacts at varying price levels.

The table shows the largest reduction for any one county is estimated to occur in Douglas County, Oregon, followed closely by Jackson and Lane Counties, Oregon. These counties are in the south-central part of the State. The degree to which counties will be affected by these revenue losses depends on the structure and strength of the local economy. Less populated counties with smaller tax bases may be less able to absorb or offset reductions than counties with larger populations and tax bases.

General Effects on Counties and Communities

Changes in timber supply will affect employment and income in timber processing and in supporting industries throughout the range of owl habitat. The effects will be most keenly felt by individuals losing employment and by the communities in which they live. The duration of the effects will depend on the availability of other employment; the skills, abilities, and willingness of individuals to relocate and take new jobs; family considerations; and many other factors.

For some parts of the three affected States, such as in or near urban areas, opportunities for making adjustments will be easier than in other areas. The communities that are most vulnerable are those beyond commuting distance from urban centers that are growing and offer opportunities for employment. In some cases, individuals will need to acquire new skills to help themselves through a transition. Such training is not equally available in all communities that may be affected. Some individuals may choose to move to a new area. The housing market in the communities they live in will be an important factor in their ability to move. The closer communities are to urban areas with diversified and growing economies, the more active the housing market is likely to be.

Table 10--Change in Estimated 1995 Payments to Counties after Implementation of the Interagency Scientific Committee Conservation Strategy--Rising Price Assumption

[Thousand of 1989 dollars]

Area	Forest Service			Bureau of Land Management			Both Agencies
	Current plans	ISC Strategy	Change	Current plans	ISC Strategy	Change	Total change
Oregon	99,341	105,695	6,354	161,705	95,703	-66,002	-59,648
Benton	569	577	8	4,544	2,688	-1,856	-1,848
Clackmas	5,198	5,380	182	8,975	5,311	-3,664	-3,482
Columbia				3,331	1,972	-1,359	-1,359
Coos	724	827	103	9,541	5,646	-3,895	-3,792
Curry	4,277	5,451	1,174	5,902	3,493	-2,409	-1,235
Deschutes	2,831	2,185	-645				-645
Douglas	15,007	19,373	4,367	40,507	23,975	-16,532	-12,165
Hood River	2,164	2,239	75				75
Jackson	3,743	4,016	273	25,339	14,997	-10,342	-10,069
Jefferson	521	417	-104				-104
Josephine	2,300	2,899	600	19,534	11,560	-7,974	-7,374
Klamath	11,739	11,056	-683	3,784	2,240	-1,544	-2,227
Lake	499	386	-113				-113
Lane	26,202	27,017	814	24,692	14,614	-10,078	-9,264
Lincoln	5,933	6,010	77	582	345	-237	-160
Linn	7,722	7,759	38	4,269	2,526	-1,743	-1,705
Marion	2,937	2,972	35	2,361	1,397	-964	-929
Multnomah	736	761	25	1,763	1,044	-719	-694
Polk	11	10	-1	3,493	2,068	-1,425	-1,426
Tillamook	3,221	3,262	41	906	535	-371	-330
Wasco	2,122	2,197	75				75
Washington				1,019	603	-416	-416
Yamhill	888	900	12	1,164	688	-476	-464
Washington	36,497	27,115	-9,382				-9,382
Chelan	2,587	2,789	202				202
Clallam	2,441	996	-1,445				-1,445
Clark	19	16	-3				-3
Cowlitz	281	242	-39				-39
Grays Harbor	753	307	-446				-446
Jefferson	3,295	1,346	-1,950				-1,950
King	821	383	-438				-438
Kittitas	783	761	-22				-22
Klickitat	122	106	-16				-16
Lewis	5,194	4,400	-794				-794
Mason	774	316	-458				-458
Okanogan	1,553	2,568	1,015				1,015
Pierce	319	148	-171				-171
Skagit	1,272	595	-677				-677
Skamania	11,024	9,483	-1,541				-1,541
Snohomish	1,549	724	-825				-825
Whatcom	2,053	961	-1,092				-1,092
Yakima	1,655	973	-682				-682

The ability of individuals and communities to adjust is therefore heavily influenced by their geographic location with respect to urban areas. In addition, adjustments are likely to be easier in communities that: (1) are not primarily dependent on a single mill for the bulk of their basic employment and income and (2) have some diversity in basic income, either through business diversification or some other source of economic growth, such as an increase of retirees.

Local effects will also be greatly influenced by the efficiency and determination of existing wood processing and production industries. Some operations may continue to operate profitably on a greater share of the reduced timber supply as less efficient operations close down.

Given considerations as described above, on the maps in the Appendix, the cross-hatched areas in the three States may be most vulnerable to social and economic effects resulting from potential reductions in timber supply. The red dots on the maps are those communities where: (1) a large share of employment is in the timber industry, (2) the timber industry is dependent on National Forest and Bureau of Land Management timber for a large share of its log supplies, and (3) other sectors of the economy are not experiencing healthy economic growth. The most vulnerable areas are rural and straddle the Coast and Cascade ranges of Washington, Oregon, and California.

Social and Other Impacts

There are many social and other impacts associated with the reductions in Federal timber harvest analyzed in this report. Most of them are difficult to quantify. The brief discussion here mainly lays out the kinds of impacts to be expected.

The major social impacts of reducing the ASQ for Federal lands is the loss of over 25,000 direct and indirect jobs. This will directly affect the lifestyles of those with timber-dependent livelihoods and perhaps cause localized shifts in populations. The severity of impacts will vary by community, depending on the amount of reduction in timber harvesting and upon the degree to which particular communities are dependent on forest resources.

In rural areas where jobs are threatened, community cohesion will accelerate rapidly for a time as common adversity is confronted in response to the collective perception that jobs and livelihood are being sacrificed to protect old growth timber. This cohesion will likely result in further entrenchment of the belief that the forests are not being fully utilized and that environmentalists are "taking over". In these affected communities, the attitude toward the Forest Service and Bureau of Land Management will decline. They will see these agencies as giving in to the pressures of an elitist society. On the positive side, community cohesion will be useful as individuals struggle to help pull each other through the crisis. They will look to new entrepreneurs with mixed feelings--eager for job opportunities, but resistant to changing their traditional way of earning a living. In communities hit hardest, and after a period of unsuccessful job hunting, community cohesion will likely decline. The decline will stem from a rift in these communities between those who already have found work and those who have not. In severe cases of community dysfunction, increased rates of domestic disputes, divorce, acts of violence, delinquency, vandalism, suicide, alcoholism, and other social problems are to be expected.

In urban areas, a reduction in community cohesion is expected as old growth forests become preserved at the expense of timber harvest. Urban residents' perceptions that the resource use is out of balance will have been addressed. They will have been heard and their wants, needs, and desires on this issue will have been satisfied for a time. Without a common cause, cohesion will diminish, especially among the environmentally oriented

subsets of the urban populations, who will move on to other issues. Some disorientation in urban communities' facilities and services is possible if large numbers of dislocated workers relocate there from rural areas.

Small population shifts may take place in some rural areas in the short term. Over the long term, larger out-migrations may occur in areas which have not adapted to the changing mix of resource use. Shifts will occur mostly where there are major harvest reductions and where there are no urban areas within work-driving distance. The central tendency will be for the rural displaced workers to remain in their same communities, even if they have to commute long distances to find jobs. While the regional shift is not likely to be significant, some small remote communities may feel the impact, primarily in the form of a significantly reduced tax base.

Reduced income and employment associated with a lower Federal timber sale program have implications for other parts of the economy in the three West Coast States. For example, tax revenues will fall, as will real estate values.

Tax revenue derived from income taxes at the state level would decline as income is reduced. Reduced income would also cause a reduction in consumer purchases, resulting in a reduction in revenue generated from state and county sale taxes.

Lower employment in the region implies some relocation of workers and their families to other regions of the country. One result of this relocation would be a decline in residential and commercial real estate values. This decline in real estate values would result in a decline in property taxes collected by state and local governments.

Tax revenues generated from business would also decline under a scenario of lower Federal timber sales. This revenue decline would be the result of declines in tax revenue from the wood products industry as production falls and from tax revenue declines from service industries in the region.

Summary of Economic Impacts and Implications for Mitigation Measures
The analysis of economic impacts has identified the size and geographic distribution of the following effects:

- o Employment
- o Federal revenues from timber sales
- o Federal payments from timber sale revenues to States

The analysis acknowledges that there will be some market-oriented mitigation of impacts. For example, in the short term, private timber harvest will increase because of higher stumpage prices and this will tend to offset a portion of the decline in employment and income associated with implementation of the ISC recommendations. Higher stumpage prices in the three West Coast States will also offset a portion of the decline in payments to States from timber revenues.

In general, the effects on employment and income will be pervasive throughout the rural and timber-dependent communities in western Washington, western Oregon, and northern California.

General orders of magnitude for effects are:

o Federal harvest will support 25,000 fewer jobs in the three States. About half of this will be offset by increased harvest on private lands in the short-term, but by the end of the decade employment effects will be even greater.

o $148 million decline in Federal revenue from timber sales by 1995, and $229 million decline by 2000.

o About $74 million decline in payments to States from Federal timber sale revenue in 1995 growing to $95 million by 2000.

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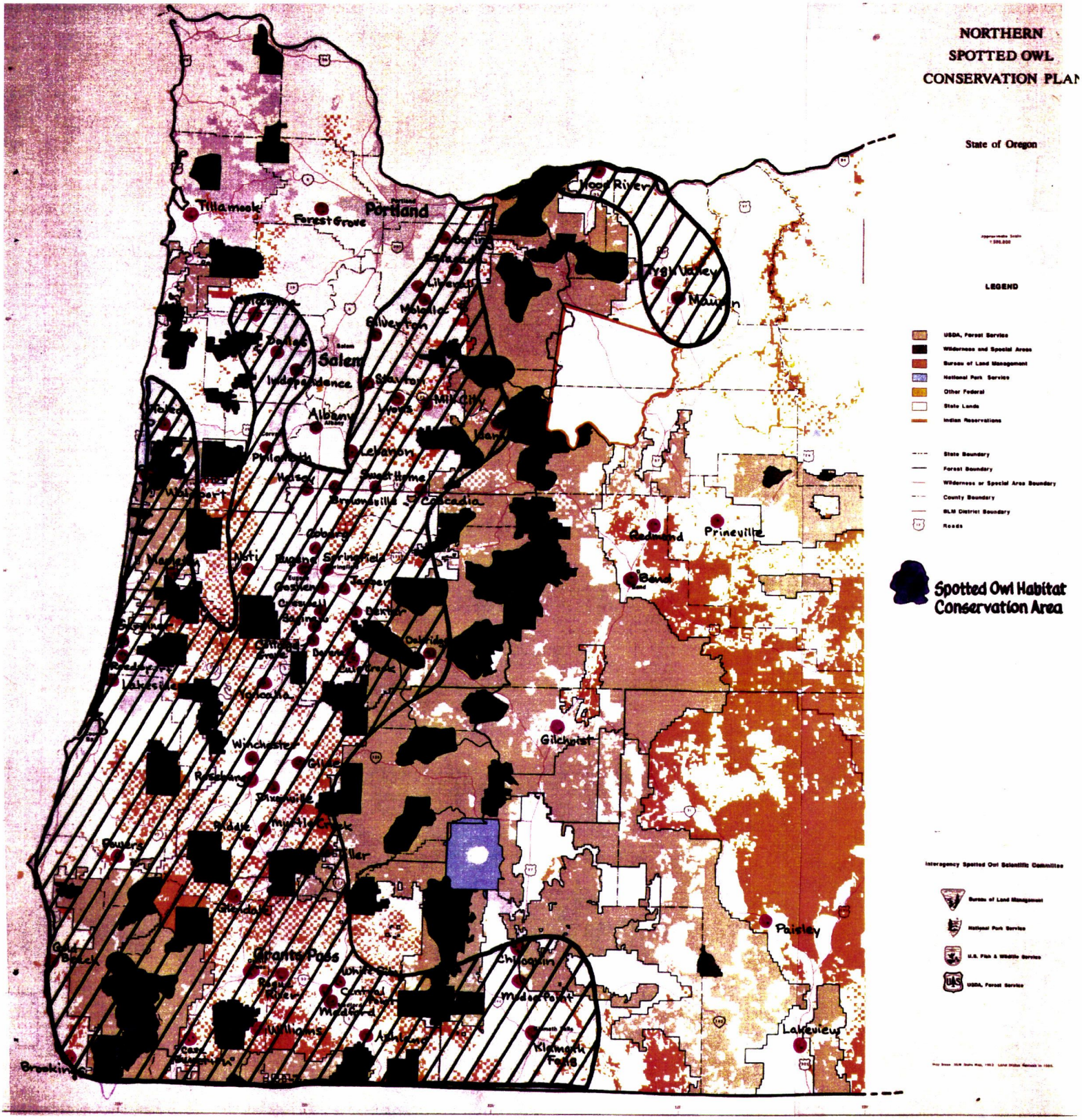
Appendix

APPENDIX I

This appendix contains three maps. The maps were taken from the Interagency Scientific Committee report "A Conservation Strategy for the Northern Spotted Owl." In that report, the maps displayed land ownership patterns and the distribution of Spotted Owl Habitat Conservation Areas. This information is retained here.

Two additional pieces of information have been added. The cross-hatching shows areas in the three States that may be most vulnerable to social and economic effects resulting from potential reductions in Federal timber supply. The red dots on the maps are those communities where: (1) a large share of employment is in the timber industry, (2) the timber industry is dependent on National Forest and Bureau of Land Management timber for a large share of its log supplies, and (3) other sectors of the economy are not experiencing healthy economic growth. The most vulnerable areas are rural and straddle the Coast and Cascade ranges of Washington, Oregon, and California.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National Park Service
Other Federal
State Lands
Indian Reservations
State Boundary
Forest Boundary
Wilderness or Special Area Boundary
County Boundary
BLM District Boundary
Roads
Spotted Owl Habitat
Conservation Area
Interagency Spotted Owl Scientific Committee
Bureau of Land Management
National Park Service
U.S. Fish & Wildlife Service
USDA, Forest Service
Tillamook
Forest Grove
Portland
Salem
Albany
Lebanon
Sweet Home
Eugene
Springfield
Cottage Grove
Roseburg
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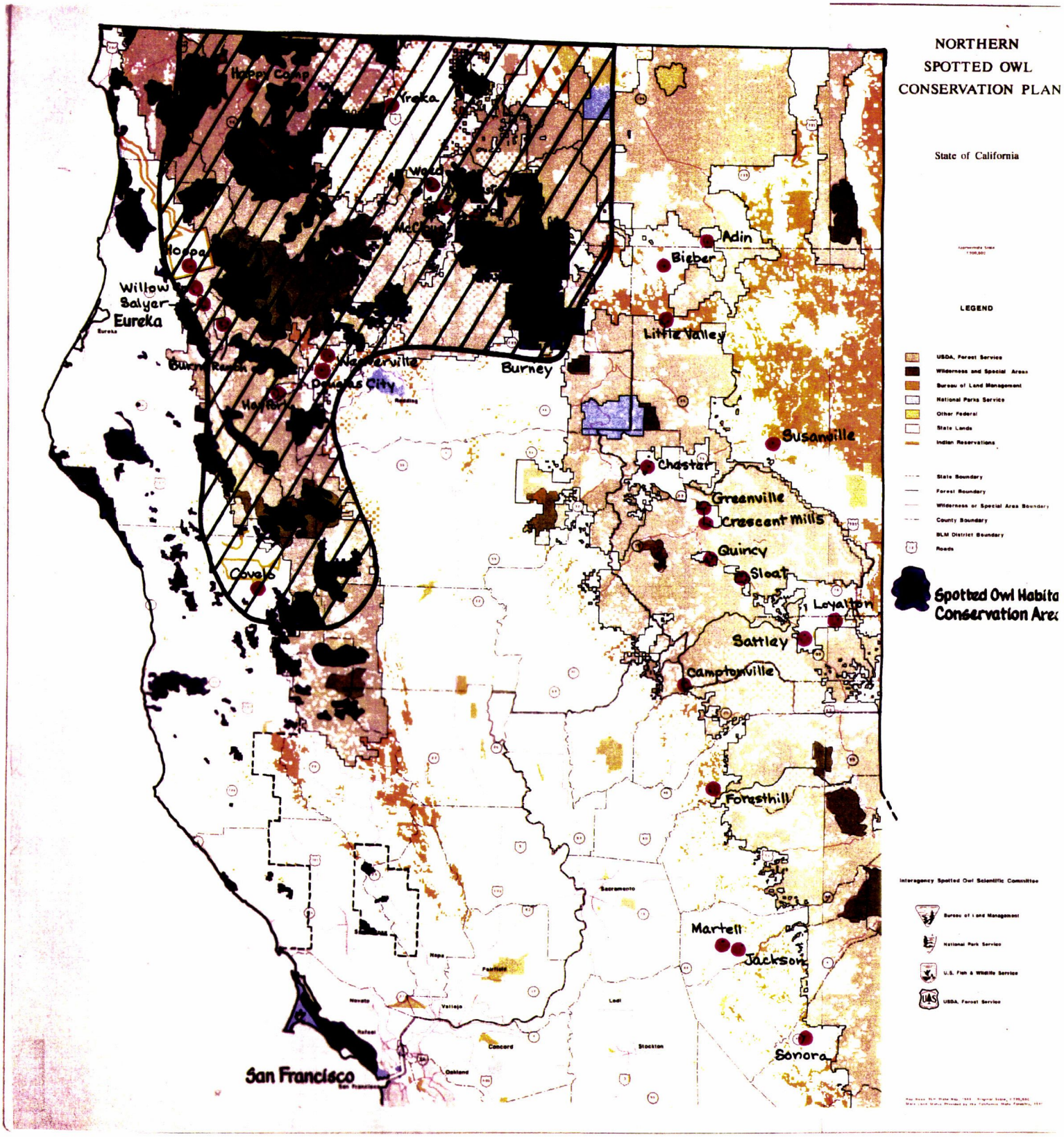
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U.S. Fish & Wildlife Service
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Willow
Salyer
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Adin
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Susanville
Chester
Greenville
Crescent Mills
Quincy
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Loyalton
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Camptonville
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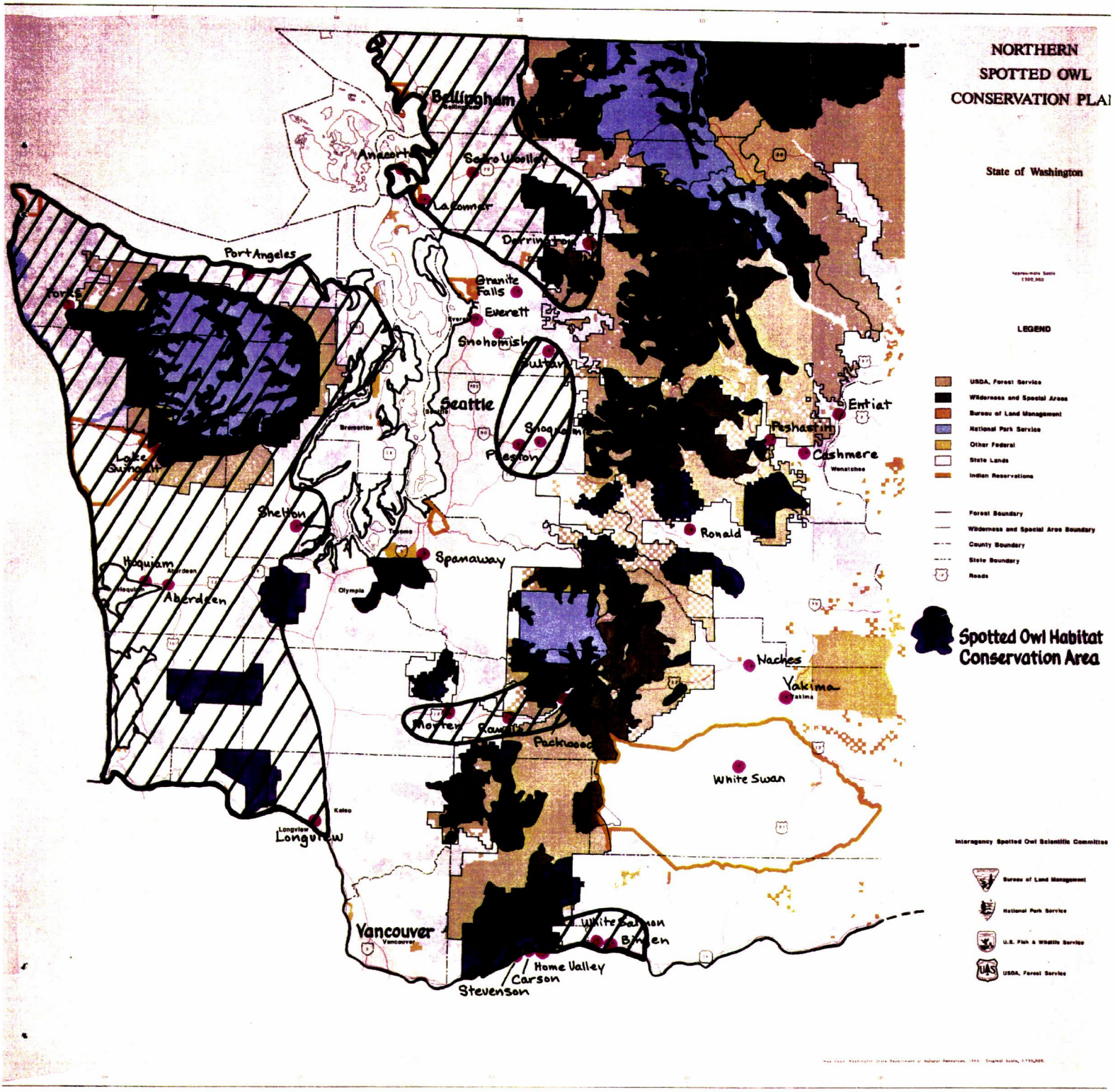
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USDA, Forest Service
Bellingham
Anacortes
Sedro Woolley
La Conner
Darrington
Port Angeles
Forks
Granite Falls
Everett
Snohomish
Sultan
Seattle
Bremerton
Snoqualmie
Preston
Lake Sutherland
Shelton
Tacoma
Spanaway
Olympia
Hoquiam
Aberdeen
Entiat
Peshastin
Cashmere
Wenatchee
Ronald
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Packwood
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Longview
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White Salmon
Bingen
Home Valley
Carson
Stevenson